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### THE VERNES TEST AS APPLIED IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS AND TUBERCULOSIS.<sup>1</sup>

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DR. VERNES makes great claims for his test and his technique, and he has inspired a great many workers who, in their claims, are as bold as or even bolder than the author himself. The method has become widely current in France. A journal devoted to the records of cases and results is now being published and a remarkable body of experience is being accumulated and this in the form of graphs giving details of tests and of treatment.

Some of the claims and the evidence on which they are based, together with a description of the method and its uses, are to be put before you tonight and

Dr. Sara Gundersen will demonstrate afterwards. The literature coming out from *l'Institut Prophylactique* is voluminous and extracts have been made from several of the fascicules published therefrom by Dr. Vernes himself, but for the most part my material has been taken from a small book, "*Ce Qu'il Faut Savoir de la Méthode Syphilimétrique Vernes*," by Marcel Leger and Gustave Martin, both on the staff of the Institute, but also of *l'Institut Pasteur*, Paris.

I need not speak here, nor is it necessary to spend time in demonstrating the tremendous advance which followed from the discovery of the complement fixation test. This method was applied to the diagnosis of syphilis by Wassermann who used as antigen an aqueous extract of liver from a congenital syphilitic and therefore rich in treponemata. As a matter of fact, later researches soon showed that such an antigen was quite unnecessary, that syphilitic liver could be replaced by normal liver from a healthy man, or by heart muscle, or even

<sup>1</sup> Read at a meeting of the Victorian Branch of the British Medical Association on October 1, 1930.

by chemical products, for example, lecithin *et cetera*. Thus the Wassermann reaction is not in the same category as the true Bordet-Gengou reactions for other diseases.

#### FLOCCULATION.

At about the same time various workers, Landsteiner, Wassermann, and Levaditi, made the discovery that the serum globulins in cases of syphilis are very unstable and are precipitated in contact with colloidal substances such as extracts of organs. But the normal blood serum itself is a colloid solution in which flocculation, that is, a concentration of the molecules so that they are thrown out as particles, is readily brought about in a variety of ways, hence this phenomenon of flocculation is not confined to sera from persons suffering from syphilis—it is a general one with all serum—but shows characteristic variations, both qualitative and quantitative, with the various diseased conditions. Thus the mixture in suitable proportions of a normal blood serum and either another colloid solution, or a solution containing an electrolyte, produces a precipitate. The first formed granules are microscopic, then macroscopic, the turbidity is more and more marked and flocculation occurs. A simple experiment will show what happens.

In each of a series of twenty tubes place 0.2 cubic centimetre of normal serum unheated. Then add to each 1.4 cubic centimetres of a watery solution of sulphate of nickel in decreasing dilutions, from saturation in tube 1, half saturation in tube 2, quarter saturation in tube 3, and so on. On shaking it will be seen that there is a remarkable difference in the turbidity of the tubes, extreme in number 1, almost nil in tubes 2 and 3, and then gradually increasing in tubes 6, 7 and 8, in which it is maximal, fading out in the rest. Such a wavy curve of turbidity occurs with every serum, but differs in type with normal and diseased serum. The problem is then to find the suitable reagent which, with a particular disease, will give a flocculation curve specific for that disease, just as the spectrum bands of absorption are specific. The practical working out of this involves a great deal of detailed experimental work, but Vernes and his colleagues have done it exhaustively with two diseases, namely, syphilis and tuberculosis.

#### THE FLOCCULATION TEST IN SYPHILIS.

First, then, let us consider the method applied in the case of syphilis. Syphilis, dormant for years, even after prolonged treatment, may light up afresh with tragic results. The old mercurial treatment, persevered with, often gave excellent results, whereas, paradoxical as it may seem, disastrous results have seemed to multiply as the therapeutic means at our disposal have improved. Since the use of "606" became general, with rapid effects against the superficial manifestations of the disease, there has arisen a false estimate of the real value of the early disappearance of these visible manifes-

tations, notwithstanding the fact that the infection is not by any means necessarily overcome when chancres, rash, mucous plaques *et cetera* have disappeared.

Can investigations in the laboratory determine the full effects of treatment and the real state of the case?

What is required, surely, is a series of periodical tests, for both blood and cerebro-spinal fluid, quantitative in kind, capable of being plotted on a graph similar to a temperature chart. Now the Wassermann test used quantitatively must be considered a very complicated method, with many variables, for the determination of the true state of the reaction of the body against the syphilitic infection. There are great advantages in the elimination of these variables and in the use of the simpler flocculation reaction if a suitable and reliable technique can be found. The two tests demonstrated tonight, the Kahn and the Vernes tests, are attempts to provide such a technique. Let me proceed to describe the latter.

#### THE VERNES TEST IN SYPHILIS.

Vernes has chosen for the sero-diagnosis of syphilis an extract of horse's heart in absolute alcohol after preliminary extraction with ethylene perchloride (so-called "péréthynol"). The substance chosen must be one which will give a curve widely different with normal serum and with syphilitic serum and this is the case with péréthynol. Thus a zone of differentiation can be found where normal serum does not flocculate and syphilitic serum alone does.

It is nothing short of a revolutionary change to be able to determine by an optical method, precise and yet simple, the flocculation characteristic of a syphilitic serum and to indicate by a numerical scale the intensity of the infection at any given time. To this procedure the author has given the name of "syphilimetry" and it is intended as a definite guide for treatment. A definite fall in the curve indicates effective treatment, whereas the absence of a fall or a definite rise is the indication for a change of treatment.

The supreme advantage of the method is that it replaces the vague notation +, ++, +++ or - or  $\pm$ , which is subject to considerable variation, according to different observers, with a numerical notation which varies very little, if at all, at the hands of different observers. This notation, by giving a numerical value, is the corner stone of "syphilimetry" and the scale has been worked out on many thousands of cases and the zero point determined, so that it shall not be too low (when it would give false positives) or too high (when some cases would be undetected). It should be noted, however, that "syphilimetry" does not consist simply in registering one isolated result furnished by the photometer; it is the record of a series of measures forming a graph indicative of the oscillations of the infection. Contrary to what is characteristic of normal sera, the precipitate obtained from the serum tested at

intervals in a case of syphilis increases and diminishes, and these oscillations are characteristic of syphilis. In more than 1,000,000 tests of serum on more than 80,000 graphs Vernes has never seen a case with clinical proof of syphilis in which these oscillations did not occur, and on the other hand this feature has never been met with in any disease but syphilis. The amplitude of the oscillation is then the serological characteristic of syphilis, and the variations in the condition of serum and cerebro-spinal fluid can be followed with sufficient security as to form the guide of all treatment.

The apparatus consists essentially of two parts, namely: (i) A very ingenious mixer ("mélangeur") for making a regular and quite uniform dilution of the antigen ("péréthynol"); and (ii) the photometer itself, by which the intensity of the light passing through the turbid mixture of antigen and serum is measured. There is a scale inside the instrument and when, by means of an adjustable screw, the intensity of a standard image and the image from the serum under test have been made equally luminous, the figure on the scale gives a measure of the flocculation produced. It is essential, then, that the mixing of the Vernes antigen with distilled water be always carried out in the same way. This is secured by means of the mixing device or mélangeur.

#### Technique.

But now let me turn to the practical technique for the examination of a sample of serum, possibly syphilitic.

**Taking the Blood.**—It is important to take enough blood; Vernes recommends taking thirty cubic centimetres. The tube should be clean and dry and preferably sterile. Next day the serum is poured off and then centrifuged; finally it is heated at 55° C. for thirty minutes.

**Mixing Serum and Reagent.**—Two tubes are essential for each serum, one for the reaction and one as control. If, however, the amount of serum is sufficient, it is recommended (and practised by Vernes himself) to do everything in duplicate. Thus in each of four tubes is put 0.8 cubic centimetre of the previously heated and cooled serum. There is then added in the two reaction tubes 0.4 cubic centimetre of a péréthynol dilution and in the two control tubes 0.4 cubic centimetre of an alcohol dilution well mixed.

The four tubes are provided with rubber stoppers and kept in a water bath at a temperature of 25° C. for four hours. First read the optical density of the péréthynol tube, then that of the control. The optical density of the control tube represents the proper opalescence of the serum, and its colour, due to hæmoglobin *et cetera*. The difference in the two readings represents the precipitate due to mixture of serum and péréthynol. The test can be relied on only if the control tube, after four hours at 25° C., has the same optical density as at the beginning. If not, another sample of blood must be obtained.

#### Examination of Cerebro-Spinal Fluid.

An examination of the cerebro-spinal fluid is essential in any case of syphilis. The cerebro-spinal fluid is normal: (i) when the index in the photometer is zero, (ii) when the number of leucocytes is less than two per cubic millimetre, and (iii) when the amount of albumin does not exceed 0.2 gramme per thousand cubic centimetres.

Lumbar puncture to obtain cerebro-spinal fluid is a simple operation without danger; it was practised 25,000 times at *l'Institut Prophylactique* between 1916 and 1924. Two clean tubes, one marked at six cubic centimetres and one marked at two cubic centimetres, are used. The six cubic centimetres of fluid are used to determine the reaction with péréthynol, the two cubic centimetres for a cell count and the albumin content.

**The Cell Count.**—The fluid is shaken up and one cubic centimetre is pipetted carefully into a clean tube, which has been previously heated to redness in the blow pipe flame to burn up all dust. One drop of Unna's polychrome blue is added and then with a pipette sufficient of the fluid is placed on a Vernes's counting slide, which has a counting chamber similar to that on a hæmocytometer.

**Estimation of Albumin.**—One cubic centimetre of cerebro-spinal fluid is pipetted into a clean tube similarly prepared to that used in the cell count and to it is added 0.2 cubic centimetre of nitric acid (61%). The mixture is shaken up and left to stand for ten minutes. Meantime the optical density of a tube filled with distilled water is read off in the photometer. Then the optical density of the tube containing the mixture of cerebro-spinal fluid and nitric acid is read in the photometer. From the figure thus obtained is subtracted the figure for distilled water; the difference represents the optical density due to the cloud of albumin. Suppose this number to be 60. We then refer to a graph, which has been worked out laboriously, showing the weight of albumin in grammes per litre corresponding to any optical density; in this instance the figure is 0.40 gramme per litre. Hyperalbuminosis alone, without any excess of leucocytes or reaction of cerebro-spinal fluid with péréthynol, does not indicate any active syphilis, but it is not rare as an indication of an earlier infection; in other words, after complete cessation of activity this sign may still remain.

**The Photometric Index.**—The test for ascertaining the photometric index is carried out by putting 1.6 cubic centimetres of cerebro-spinal fluid (unheated) into a small tube with 0.4 cubic centimetre of the péréthynol suspension. The optical density of this mixture is read in the photometer and recorded. The tube is then stoppered with india-rubber and kept in a water bath at a temperature of 25° C. for four hours; its optical density is again read in the photometer. Syphilitic cerebro-spinal fluid gives a higher figure after incubation and the difference between the first and second readings is the syphilimetric index.



### Syphillimetry as a Key to Diagnosis.

#### Blood Serum Test.

The first requirement is to find the frontier between normal and syphilitic sera. Flocculation in a syphilitic serum is only an exaggeration of the flocculation with a normal serum, just as a febrile temperature is an exaggeration of the normal temperature. The photometer scale figures for syphilis vary between 0 and 150 or even higher. A few normal persons have an index higher than zero, just as a few persons have a temperature higher than 36.9° C. (98.4° F.). Out of thousands of cases, in 2% the index "four" is reached, in one in 500 the index "six" is reached, in one in 2,000 the index may be "seven" to "ten." The normal persons who have an index beyond "ten" are negligible, because, it cannot be too often repeated, an isolated index figure has no absolute value; it is the graph which is significant and trustworthy.

#### Cerebro-Spinal Fluid Test.

Except in the very initial stages of syphilis, it is necessary to test the cerebro-spinal fluid as well as the blood serum, if the whole truth is to be known. Man indeed reacts to syphilis as though he were made up of two separate compartments, the blood-vascular on the one hand, the cerebro-spinal on the other hand. Both may be infected at the same time, but the second (cerebro-spinal) may be infected, whilst the first is normal, or *vice versa*. Note that a rise in the photometer scale figure for the cerebro-spinal fluid is an indubitable sign of meningeal infection, but it is accompanied by two further signs of importance, namely, the leucocytes of the cerebro-spinal fluid in excess of two per cubic millimetre, and an amount of albumin exceeding 0.2 gramme per 1,000 cubic centimetres. One or both of these often precede the superflocculation of the cerebro-spinal fluid, and they may remain after abnormal flocculation has ceased, showing that cure is not yet complete. In a few cases definitely cured an excess of albumin alone may continue indefinitely. It must be remembered that, in exceptional instances, infection may exist and yet blood serum and cerebro-spinal fluid may appear normal to test. One may imagine the elimination of toxic products as fast as their production. Such a condition of equilibrium can usually be overcome by provocative treatment with arsenic, for example, three injections of novarsenobenzol on the first, fourth and tenth days; this is what Vernes calls "*un jalon provocateur*." Arsenical preparations have indeed this characteristic effect in the treatment of syphilis, that whilst a strong dose may be effective in destroying the treponema, a feeble dose only seems to increase the vigour of the parasite. Thus this provocative dosage, dangerous if not followed up by vigorous treatment, is not only justified, it is called for in any case of suspected infection in which the serum index is zero.

#### Syphillimetry as a Basis for Prognosis.

The rises and falls of activity of infection are shown on a chart just as are changes of temperature in a fever. The chart or graph of a patient on whom

repeated tests have been performed, shows whether the disease is active, whether it is in process of cure by a particular therapeutic agent, or if it reacts slightly or not at all to that particular treatment. The examination of the serum alone—as for diagnosis, so for the purpose of prognosis—is insufficient. It is imperative to test also the cerebro-spinal fluid. Syphillimetry will indicate the rises and falls of the infective process and will allow of their being followed. In a period of increasing activity the photometric indices increase fairly regularly and often quite quickly. In the converse condition they diminish just as quickly. Thus the matter of supreme importance for a sound judgement is to follow the photometric curve and to see how the patient responds to the treatment applied. A patient under such supervision has a security comparable to that of a train with signals clear ahead and the freedom from the possibility of any collisions from behind.

When the index has been brought back to zero it is important to discover whether the danger is over and that this zero figure is definite and final. To content oneself with an isolated record of zero is a grave error. Vernes, from his wealth of experience, is able to state a rule which is of the utmost importance:

**The Eight Months Rule.**—Suppose after a course of treatment the zero figure is arrived at, then if the final treatment was by means of an arsenical preparation, the period of suspended judgement may proceed. If arsenic in some form was not the agent with which the treatment closed, one should submit the patient to a provocative dosage—"*un jalon provocateur*"—and again test the serum. If the figure zero is again obtained, the waiting period commences. For eight months the patient receives no treatment, but his serum is examined monthly and should have an index of zero each time. At the end of the eight months a specimen of cerebro-spinal fluid is tested for its photometric index, cell content and albumin. If the photometric index is zero, the leucocytes do not exceed two per cubic millimetre and the albumin does not exceed 0.2 gramme per 1,000 cubic centimetres, the patient may be considered cured and the infection sterilized. Vernes has never seen a relapse, never a rise of the index figure. On the other hand, such patients may marry without risk; moreover, they are susceptible to reinfection with syphilis. If, however, at the third, fourth or fifth month and, much less commonly, at the sixth or seventh month, the index figure of the serum rises, or the cerebro-spinal fluid is not normal in all three respects, treatment must be recommenced.

#### Syphillimetry as a Guide for Treatment.

Vernes and his colleagues do not lay down any fixed rule for treatment. In every case the disease is *sui generis* and must be treated on its merits. Any rigid following of a preconceived scheme of treatment may convert an infection of moderate gravity into one of the most serious type. Not in every instance will the disease respond in the same way to a particular therapeutic agent; indeed in some cases a particular strain of the infecting agent seems to have special idiosyncrasies. The reaction to a particular drug, excellent in many instances, may be extremely variable. Now when an agent in a particular case is ineffective, it is highly important to be aware of that fact as soon as possible, so as either to increase the dosage, alter the frequency of



doses or, better, to try another remedy. This is one of the outstanding merits of the Vernes technique, that if a course of treatment by a particular agent, arsenic, bismuth or mercury, does not cause the photometric index to decline, another agent may be at once substituted and tried out, so saving time and labour and money and, what is worth a great deal, conserving the patience and perseverance of the patient. Occasional intermittent courses of treatment, not going to finality, are deplorable; it is to this practice that syphilis owes its reputation of being incurable. Short courses of treatment, notably with "arsenicals," have had a great vogue, but it is as difficult to defend the practice as to apologize for the grand old Duke of York, who was in the habit of marching his men up the hill only to march them down again.

#### THERAPEUTIC AGENTS IN SYPHILIS.

The very large experience gained at the *Institut Prophylactique* by Vernes and his colleagues entitles their opinions to very serious consideration, and I venture to quote a few of their ideas.

The medical practitioner has three groups of drugs in his armament whose use he should understand thoroughly. Mercury is slow in action, but it searches out the treponema even in the most resistant foci. Two important points with regard to the use of mercury are: (i) it acts like a mordant towards the other two agents, arsenic and bismuth, so that, after a course of mercury, they are much more effective than without it; (ii) it never has the provocative action that is common with ineffective doses of arsenic.

Arsenic is very effective against the superficial manifestations of syphilis, but its action appears limited in depth of penetration. Such centres of resistance as the wall of the aorta are not easily reached. Arsenic, which is not effective, is actually dangerous in stimulating the infective agent. Its use, therefore, requires to be continually controlled by tests of both serum and cerebro-spinal fluid. Arsenical treatment preceded by treatment with mercury has much more chance of being completely effective. If a patient cannot be kept under supervision to the end of the arsenical treatment, then continue with mercury until control is again possible. If his serum then has an index of zero give him the "jalón arsenical" and apply the "eight months rule."

Bismuth salts tested out on animals, first by Sauton and Robert and then by Levaditi, in 1921, have been found very efficacious in some cases, but quite useless in others. Here again control of the treatment by repeated serum and cerebro-spinal fluid tests is the only safeguard against dangerous waste of time and effort.

#### GENERAL INDICATIONS FOR CONTROLLED TREATMENT AT DIFFERENT STAGES OF THE INFECTION.

There is no set rule. Each patient must be treated according to his individual requirements. The objective is to return a hyperflocculating serum to normal and the one general rule is to use a drug only so long as it is effective and to change to another whenever the first is seen to be useless. Once the diagnosis has been made, treatment is commenced without delay, preferably with a course of mercury cyanide, administered intravenously daily for ten days, starting with a dose of 0.5 centigramme the first day and then 1.0 centigramme on the following days. As an alternative the drug may be given on alternate days for five doses as follows: 0.5, 1.0, 1.5, 2.0 and 2.0 centigrammes. After the mer-

cury, follow with a fortnight's bismuth treatment, giving two or even three intramuscular injections per week. A blood test should be made the first day. The bismuth is followed by a short course of arsenic. Again a serum test is made on the first day. The indications furnished by the graph of serum and cerebro-spinal fluid tests will guide future treatment. But some may say this method deprives the patient of the rapid action of arsenic on local cutaneous or skin lesions and leaves him the longer contagious. Vernes's answer is, the object is not a rapid, temporary and partial amelioration, but a permanent cure. Thus the method advised is ten days of mercury, fifteen days of bismuth and twenty-four days of arsenic, with at least five blood tests.

Very generally with a case taken in this initial period of syphilis the photometric index will be brought back to zero before the end of this course of treatment. But the aim is to render that zero permanent. For this to occur it is well to repeat the course of treatment, in the same order and without any delay, at least once and sometimes twice. If any of the three drugs have been shown to be useless, that agent is omitted, but the use of the other two lengthened. The treatment must end with arsenic—three injections at least of "Nov-arsenobenzol"; "le jalón" and the application of the "eight months rule" follow.

#### THE VERNES TEST IN THE DIAGNOSIS OF TUBERCULOSIS.

In the application of the Vernes test to the diagnosis of tuberculosis the reagent used is not péréthynol, but a solution of resorcin. This gives a characteristic curve with tuberculous serum and is of practical value in the diagnosis of the disease in early or doubtful cases, as well as furnishing an indication of the progress of the disease and the effect of different lines of treatment.

#### THE PREPARATION OF HUMAN IMMUNE SERUM FOR THE TREATMENT OF POLIOMYELITIS.<sup>1</sup>

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IN March, 1929, the Infantile Paralysis Committee requested that the Royal Prince Alfred Hospital laboratories should undertake the preparation of serum obtained from human donors for use in the treatment of poliomyelitis. The request was acceded to, and the work was commenced immediately.

At the outset the organization for the collection of donors had not been set in operation, and for a time this laboratory undertook to obtain donors until such time as the medical officer to the Committee should be appointed. It was first necessary to devise an apparatus suitable for the collection of large quantities of blood, and to decide on the best means for the separation of serum and a suitable method for rendering it sterile.

<sup>1</sup> Read at the first annual reunion of the Royal Prince Alfred Hospital Residents' and Ex-Residents' Association, October 7 to 11, 1930.

A method of collection and preparation has already been described,<sup>(1)</sup> but the method used in this laboratory differs in some respects which justify comparison with the method referred to above.

The important points to be attended to in obtaining large quantities of human blood are, to enter the vein at the first attempt, to keep up a rapid flow of blood, and so obtain the quantity required well within the coagulation time of the blood. If this is done, there is then no need to take measures to prevent the blood clotting.

Some years ago I devised an apparatus for the drawing of blood for transfusion. This had proved such a success that it was decided to apply the same principle to the present case. With this apparatus no difficulty has been experienced in obtaining the maximum quantity of blood the donor has been capable of giving. No precautions have been necessary to prevent clotting in the needle, by the use of paraffin, sodium citrate *et cetera*, and above all, it is possible to use a needle of approximately only half the gauge of that ordinarily used in transfusion work. This is a most important point when dealing with young children, but it is appreciated just as much by the adult.

The apparatus used is described in Figure I. The principle adopted is the same as that adopted in Behring venules and Kiedel tubes, that is, the maintenance in the container of a negative pressure. To obtain this, the apparatus must be absolutely airtight and the rubber tubing used must be sufficiently thick-walled so that it will not collapse under pressure. Flasks have been discarded in favour of bottles, 900 cubic centimetres Merck's reagent bottles are very suitable, being thick-walled, but of sufficiently good glass to withstand autoclaving, and are very cheap as compared with flasks. The glass tubing is of one-quarter inch outside diameter, and the rubber tubing  $\frac{3}{8}$  inch inside diameter and  $\frac{3}{8}$  inch wall, thus making a tight fit on the glass tubing. All glass to rubber joints are closed by means of small brass hose clips. The needles used were 17 or 18 gauge rustless "Record" with syringe fitting adapted to rubber tubing.

All bottles were fitted up with emergency needles in case clotting should occur in the one first used, but in no case was it necessary to resort to an emergency needle. The rubber bung is kept down by means of a specially devised clamp shown as "4" in Figure I. The negative pressure was obtained by means of a Potain aspirating pump.

#### The Drawing of Blood.

The patient is instructed to report at 2 p.m. without having had luncheon. This assists in obtaining a clear serum free of fat *et cetera*. The arm is suitably cleansed and a tourniquet applied lightly to the upper arm. The two rubber tubes leading to needles "9" and "10," Figure I, are closed by means of spring clips, and a slight negative pressure produced in the bottle. It is important not to evacuate the bottle too much, as on entering the vein it will then immediately collapse and no blood can be obtained.

A small area of skin over the vein is then frozen with ethyl chloride and the needle passed into the vein. The clip on the rubber tubing is then opened and the blood should flow readily and rapidly. If the flow should lag, an occasional stroke of the pump or the temporary release of the tourniquet will improve it. When the required quantity of blood has been obtained, the clip on the tubing is closed and the needle then withdrawn from the vein. If the needle is withdrawn before the clip is closed, the consequent rush of air is likely to contaminate the specimen.

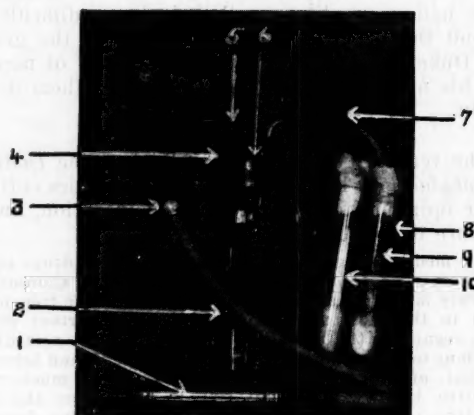


FIGURE I.

1=Potain aspirating pump. 2=Bottle 900 cubic centimetres for blood. 3=Glass bulb filled with cotton wool for filtering air. 4=Clamp for rubber bung. 5=Glass tubing one-quarter inch diameter. 6=Rubber bung. 7=Brass hose clip. 8=Test tube 7 by 1 inches for covering needle. 9=Needle "Record" 17 gauge for drawing blood. 10=Emergency needle.

#### Separation of Serum.

The rubber bung and its fittings are now replaced by a sterile cotton wool plug, and the blood placed in the incubator at 37° C. for an hour. It is then stored in the cold at 6° to 8° C. for from four to five days. A maximum retraction of the clot is thus obtained, and hæmolysis has not been observed. Samples of serum are then drawn for the determination of the Wassermann reaction of each. No positive reaction has been encountered in any donor.

The serum is now aspirated from the clot by means of the apparatus shown in Figure II.

The glass pipette "3" is inserted into the bottle containing the blood. The taps "7" and "18" are opened. Tap "18" is opened to allow the air displaced from the pressure chamber "9" by the incoming serum to escape. The bulb of the Higginson syringe is then compressed. As the pressure on the bulb is released the serum is aspirated into the bulb. The pipette "3" has its point turned upwards so that the maximum amount of serum may be obtained without disturbing the clot.

As the bulb is again compressed the serum is forced over into the pressure chamber "9" of the filter. When this pressure chamber is full, taps "7" and "18" are closed and the pipette "3" is held by the cotton wool plug so

that it does not disturb the clot. Air under pressure is now introduced into the pressure chamber "9" by means of a bicycle pump attached to the Schrader valve fitting "19." One works with a pressure of three to four pounds which is registered on the gauge "17." This incoming air is filtered through a large plug of sterile cotton wool in the chamber "8."

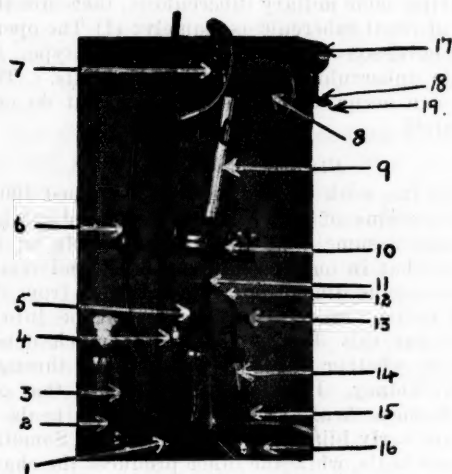


FIGURE II.

1=Bellows, double surgical, for applying air under pressure. 2=Bottle 900 cubic centimetres for collecting blood as in Figure I. 3=Glass pipette for aspirating serum from clot. 4=Glass bulb filled with cotton wool for filtering air from pump "1." 5=Clamp for rubber bung. 6=Bulb of Higginson's syringe for passing serum to filter chamber "9." 7=Tap leading to pressure chamber "9." 8=Metal chamber filled with cotton wool to act as a filter to the air passed in under pressure from the pump attached at "19." 9=Pressure chamber into which serum is collected. 10=Filtering films lying between two metal plates clamped together by thumb-screws. 11=Rubber tubing leading to the collecting bottle from which serum will be ampouled. 12=Glass tubing. 13=Spring clip. 14=Filling chamber. This covers a needle which is inserted into neck of ampoule. 15=Test tube passing through rubber bung which covers filling needle. 16=Aspirating pump for emergency suction. 17=Pressure gauge. 18=Tap which is opened to allow of escape of air displaced from pressure chamber "9" by the serum. 19=Schrader valve fitting for attachment of pressure pump.

When all the serum has been filtered, the tubing "11" is clipped off by means of a spring clip and the end of the tubing is covered by a sterile test tube closed by a wool plug.

The filters used have been Seitz, size 14. These have proved to be extraordinarily rapid and efficient. In no single instance was a filtered sample found to be contaminated. In the essential part of the filter I have always inserted two films, one to clarify any gross turbidity, and the other to hold back any bacteria. I have always neutralized these films before use.

Pressure filtration has been found to be far superior to suction filtration. With the latter method the serum is apt to froth too much. However, in case the pressure apparatus should break down, filtration can proceed without interruption by attaching a suction pump to "5" and reverting to suction filtration.

It will be evident that at no stage in this proceeding is the serum exposed to air from the time the needle

is plunged into the donor's vein until such time as the finished serum is sealed off in the ampoule ready to be used.

After filtration exacting sterility tests were applied to the product. I inoculated two sets of agar, shake and slope media, and two each of nutrient broth, Hitchen's medium and Robertson's anaerobic medium, the one set being incubated under aerobic conditions and the other anaerobically in a McIntosh and Fildes jar for fourteen days. Two guinea-pigs were injected subcutaneously and two rabbits intravenously each with two cubic centimetres from each batch of serum under test.

The serum is then stored at 6° to 8° C. for as long a period as possible in order to allow of any precipitation. After precipitation has occurred, the serum is again filtered in a manner similar to that described above and is then ampouled.

The ampouling is done by applying a pressure pump at "4," Figure II, the air forced in being filtered through the sterile cotton wool plug "4." The neck of the ampoule is introduced into the chamber "14" and the needle "14" placed well down into the ampoule. On opening clip "13" the serum will flow into the ampoule.

A naked flame is kept playing continuously at the base of the filling chamber "14." The ampoules are sealed off in the flame immediately they are removed from the filling chamber. Samples of serum are taken at intervals throughout the ampouling process and pooled for sterility tests by culture and animal inoculation.

TABLE I.

Total number of donors bled .. .. .	40
Total amount of blood drawn .. .. .	16,665 cubic centimetres
Average amount of blood per donor .. .. .	416 cubic centimetres
Total yield of serum .. .. .	6,295 cubic centimetres
Percentage of yield of serum to amount of blood drawn .. .. .	37.7
Average yield of serum per each donor of blood .. .. .	158 cubic centimetres
Wassermann test .. .. .	No reaction in all instances

TABLE II.

Age Incidence of Donors.

Age Period.	Number.
5 to 10 years .. .. .	5
11 to 15 years .. .. .	13
16 to 20 years .. .. .	11
21 to 25 years .. .. .	3
26 to 30 years .. .. .	1
31 to 35 years .. .. .	5
36 to 40 years .. .. .	2

TABLE III.

Comparison of Results Obtained by the Author's Method.

Observation.	Original Method.	Author's method.
Total number of bleedings .. .. .	34	40
Total quantity of blood obtained .. .. .	4.65 litres	16.66 litres
Total quantity of serum obtained .. .. .	1.789 litres	6.29 litres
Percentage yield of serum in final bottled product to amount of blood drawn .. .. .	38.2	37.7



### Summary.

A method of production of convalescent poliomyelitis serum has been described. The results are compared with those obtained by the original method. The larger amount of serum obtained by the author's method from approximately the same number of donors has been due to the larger amount of blood drawn from each individual. This has been made possible by the use of the apparatus and technique described. The age incidence of the donors in the original method is not available. In the author's bleedings 60% of the donors were aged from eight to twenty years. The average amount of blood drawn, 416 cubic centimetres, might seem to be a large one, but in no instance were any immediate or remote after-effects noted and all children were followed up carefully. In a few instances they have returned later to give more blood. The percentage yield of serum is almost the same in the two campaigns, 38.2% and 37.7%. Yet the use of the apparatus described above has made unnecessary the use of anticoagulants, weights *et cetera*, thus reducing very considerably the risks of contamination and producing an entirely natural serum free from all chemical interference.

### Reference.

<sup>(1)</sup> F. G. Morgan: "Collecting Blood from Donors and Preparation of Curative Serum for Use in Poliomyelitis," "Transactions of the Australasian Medical Congress (British Medical Association)," Second Session, Supplement to THE MEDICAL JOURNAL OF AUSTRALIA, October 8, 1927, page 263.

### RENAL TUBERCULOSIS.<sup>1</sup>

By F. W. D. COLLIER, B.A., M.B., Ch.M. (Sydney),  
Honorary Assistant Surgeon, Newcastle Hospital.

RENAL tuberculosis occurs mostly during the third and fourth decades of life and seems to be rare in Australia. In London at 3% of all *post mortem* examinations renal tuberculosis is seen and one-third of all kidney infections are tuberculous. In America at 1% to 3% of all *post mortem* examinations renal tuberculosis is seen (Davis). In Australia the figures must be much lower. In the last three years at Newcastle Hospital there have been only three cases of proved renal tuberculosis (0.37%) of 796 admissions for surgical genito-urinary conditions, of which 351 were kidney infections. There were only 22 deaths from the condition in New South Wales during the past two years. I have been able to recognize renal tuberculosis in only six instances during the past five years in over 750 cystoscopic examinations. Two of those affected were men and four were women. More than half the men have genital tuberculosis as well. One of my patients had an infection of the prostate and the other man had a "closed" infection without genital tuberculosis. This is an important point in deciding the question of operation.

Since the introduction of modern urology we have learnt that urinary tuberculosis, for practical

surgical purposes, starts in one kidney and remains unilateral for some time. The real primary focus, however, is elsewhere, in the lungs, mesenteric glands or bone, and is usually old, quiescent and hard to find. Practically always, then, the infection is blood borne.

### Morbid Anatomy.

Leaving aside miliary tuberculosis, there are three types of renal tuberculosis, namely: (i) The open or ulcero-cavernous type, (ii) the closed type, (iii) chronic tuberculous interstitial nephritis. These types can occur, of course, together, but do occur separately.

### Ulcero-Cavernous Type.

From the work of Medlar, who examined 100,000 serial sections of experimental renal tuberculosis, we must assume that the process starts in both kidneys, but in one it very soon heals and remains of microscopic dimensions. Nevertheless from these small lesions tubercle bacilli can escape into the urine; but this does not solve the much debated question whether the bacilli can filter through a healthy kidney. It is evidently assumed that often both kidneys heal. Sometimes neither heals and the rare early bilateral disease is seen. Sometimes only one heals, while the other produces the changes in ureter and bladder which lead the patient to seek advice. Thus the idea has arisen that renal tuberculosis is primarily unilateral; for therapeutic purposes it nearly always is.

Medlar's observations are also against the common idea that the lesion starts at the bases of the pyramids. He found 75% of the early lesions in the cortex, but these were usually small and healing. The other lesions (in the medulla and involving both medulla and cortex) tend to grow and cause the lesions that matter.

The tubercle bacillus produces its characteristic lesion and the area of necrosis advances more towards the pelvis than towards the cortex. Before it reaches a calyx, pus and bacilli may pass down the tubules and appear in the urine (Medlar). After reaching a calyx it empties its caseous material and fills with pus; if of any size it may be called a tuberculous pyonephrosis. A tuberculous hydro-nephrosis is formed when, in addition, a stricture occurs in the upper ureter. This is possible only when the ureter is infected before the pelvis is too infiltrated to dilate. The ureter is always infected early in the course of the disease.

The whole pelvis is rapidly infected when one lesion reaches a calyx. The process then infiltrates along lymph channels between the tubules towards the capsule as in an ordinary *Bacillus coli* pyelonephritis. Other lesions break out elsewhere in the kidney and in time the destructive process may involve the whole kidney, causing the so-called auto-nephrectomy.

**Pathological Appearances.** In three specimens which I removed, the lesions seen may be described briefly as follows:

<sup>1</sup> Read at a meeting of the Newcastle Hospital Clinical Society on November 5, 1930.

1. There are cavities of varying size situated towards the cortex; they have stick, rough, greenish-yellow walls and contain thick pus of the same greenish-yellow colour and lumps of old tuberculous material.

2. There are yellowish lines passing through the medulla to clusters of tubercles in the cortex; these cortical tubercles are readily visible after decapsulation.

3. Empty cavities without a lining may be observed; these have "moth-eaten" walls and are situated in the pyramids and are joined to the calyces.

4. The pelvis may be thickened and ulcerated and there may be destruction of the papillæ.

5. The ureter is hard and thickened.

In my cases I did not find extensive perinephric adhesions, though they do occur and often with abscess formation, mostly, I fancy, when there is a mixed infection of long standing. The pelvis and ureter are attacked early by an infection which commences in the submucous coat; the ureter soon becomes thickened, hard and shortened, and feels like a lead pencil. Ulceration and stricture occur and the tube is affected much more at the two ends than in the middle.

**Cystoscopic Appearances.** The bladder changes are seen by the cystoscope and are very characteristic. First, the shortened, hard ureter pulls on the orifice till it looks like a golf hole or a trumpet. The lips are œdematous and red and soon may be seen several grey miliary tubercles below the affected orifice. The bladder wall is inflamed, but only round the ureter, and does not present the appearance of generalized redness of *Bacillus coli* infection. Later these appearances are accentuated and ulcers replace the tubercles. If there is a secondary infection in the kidney, usually by the *Bacillus coli*, the whole picture is obscured, except the gaping rigid ureteral orifice, with its surrounding red, swollen mucous membrane, often in a state of bullous œdema. Davis states that the lesions may appear round the other orifice.

Tuberculous stricture of the urethra may occur and generalized tuberculosis may arise if it is dilated.

**Genital Complications.** Genital complications occur in more than half the males and may develop even after nephrectomy. The spread is by way of the prostate, the bridge between the two systems; by this method of spread the epididymis is the last to be infected. However, the epididymis is an organ easily vulnerable to blood-borne infections, so it is not surprising to learn that it may be implicated first after the kidney.

#### *Closed Type.*

Wildbolz found only five examples of the closed type of renal tuberculosis in 600 tuberculous kidneys. The lesion starts as usual in the cortex, but its growth presses on and closes the calyx instead of opening into it, and so may reach a considerable

size and become calcified. In the one specimen in my possession there are on the cortex yellow bosses of closed tuberculous foci, about the size of marbles; the rest of the kidney is not affected. Though caseated, the masses have not softened and are really tuberculomata. The patient had no signs in the bladder and the condition was thought to be renal calculus, as the masses cast a shadow on the X ray film.

#### *Chronic Tuberculous Interstitial Nephritis.*

I have never seen a chronic tuberculous interstitial nephritis. It is described as occurring with very minute and scattered lesions and with casts and albumin in the urine.

A toxic nephritis may affect the rest of the diseased kidney and the other one.

#### *Symptoms.*

My patients came complaining of frequency of micturition and a dull pain in the loin. Frequency of micturition is by far the commonest symptom and the most frequent initial symptom. Incontinence of urine develops. Urgency develops as the bladder lesions progress.

Pain is not severe in the early stages; my last patient had pain only on the healthy side. I have seen a person suffering from renal colic due to the passage of tuberculous detritus.

Only one of my patients suffered from hæmaturia. This is a late symptom; my patient was inoperable. Hæmaturia may be slight or severe and there may be long intervals between the times of its appearance.

There is loss of weight, but not usually any fever.

#### *Signs.*

Most of the people affected by renal tuberculosis are thin. Every patient who has suffered from "cystitis" for longer than three or four months should be examined by means of the cystoscope.

There is some tenderness in the loin, but as a rule the kidney is not enlarged, as tuberculosis is a destructive disease. There may be tenderness along the course of the ureter; there may be characteristic signs in the prostate, seminal vesicles and epididymis, so male patients should be examined *per rectum*. The primary focus must be sought.

The urine is acid and cloudy or clear with flakes, unless the disease is of the closed type. It contains pus and is sterile. It is very difficult to find the bacilli in the bladder urine, but on the only two occasions on which I catheterized the ureter on the diseased side they were found without any trouble.

Cystoscopy is often difficult, but can usually be managed by using small washings of the bladder and a minimum of medium. I would never catheterize the ureter of the opposite side. Such a procedure is dangerous and unnecessary if the orifice is clear of tubercles and ulcers. If these are present round both orifices, the disease has reached an inoperable stage. I catheterize the ureter on the diseased side only when in doubt, in order to get the

bacilli; I see no harm in making a pyelogram in case I fail to find the organisms. Indigo-carmin is the only agent I use for a differential efficiency test, as the use of the other agents necessitates a double catheterization and even then the urine often comes down the ureter outside the catheters. The cystoscopic appearances I have already described.

Nephrectomy has been complicated by sinus formation in only one of my five cases; in this one instance I had spilt some contents into the wound. So I do not drain under ordinary circumstances and I only remove what length of ureter is convenient and cauterize the stump.

#### A FEW SURGICAL PRINCIPLES.<sup>1</sup>

By RALPH WORRELL, M.D., Ch.M., F.C.S.A.,  
F.A.C.S. (Honorary),

Honorary Consulting Gynaecologist to the Sydney Hospital.

THE opening of the new (Travers) wing of the Sydney Hospital is an epoch in its history and I greatly appreciate the honour of being invited by the Board to perform the first operation.

I think it will be appropriate to the occasion if I make a few remarks upon some of the surgical principles which in many years of service have made the most indelible impression upon my mind.

There is one axiom taught in every great clinic and accepted by every truly great surgeon, which if a man holds as his guiding star, will stamp him as one whom a patient may trust in his hour of need. I mean: "Do unto others as ye would they should do unto you." "Who hath this, he hath," if not all, yet most of those things which bring happiness and success in the surgical profession, that is, he will by study, by watching and assisting at operations, by thinking over and reading up his cases, fit himself to give the best possible service to his patients.

He will not perform any operation unless such be in the best interest of the patient; neither will he refrain from operating in a desperate case, lest his reputation suffer, when operation may be the only hope of averting suffering and saving life.

#### Technique.

In technique hæmostasis comes first, gentleness second and asepsis third. An imperfectly secured large vessel will be fatal at once, but even a small vessel which has escaped observation, may cause death at a later stage by infection of the effused blood. A fatal result may occur from this cause following so simple a procedure as colpo-perineorrhaphy. I remember on one occasion in the golf house dressing room a layman coming up to me to tell of the sad death of a fellow member's wife after an operation (colpo-perineorrhaphy) which the husband had been given to understand was not in any

way dangerous. In all probability infection following imperfect hæmostasis, was the cause. Many instances of this kind are recorded.

In a similar case, acting for a friend, I succeeded in saving the woman by cutting the sutures on the fifth or sixth day, laying the wound widely open, evacuating broken down blood clot and irrigating with peroxide of hydrogen.

Lawson Tait was in the habit of saying that if he "could obtain sufficient of Lister's germs to make a poultice," he would "dress his wounds with them." He obtained (for that time) his wonderful results by perfect hæmostasis and extreme gentleness.

#### Rapid Operating.

I have seen many of the rapid operating surgeons of the world and always felt I should not like them to operate on any friend of mine. Such eagle speed is out of place in surgical procedures and must sooner or later lead to disaster. In amputation through the hip joint, the quicker the operation, the greater the shock, as Professor Watson has pointed out.

On the other hand, watching Lord Moynihan, I have moralized on what an apiarist he would have made: sure, methodical movements not likely to disturb the most sensitive hive of bees; one felt accident was almost impossible.

Personally, I have aimed at slow movements and quick methods. I look at the clock at the beginning of every operation, but forget all about time until the close, when I reflect whether there has been any undue delay.

#### Post-Operative Post Mortem Examinations.

The surgeon who fails to follow up his fatalities to the *post mortem* room, will not progress as rapidly as he should in judgement and surgical knowledge.

There were few, if any, post-operative deaths in my thirty-two years' service in which I did not do a limited *post mortem* examination. A few words from the surgeon himself to the friends, asking permission to reopen the wound to try and ascertain the real cause of the condition for the benefit of other members of the family and humanity in general, will almost always obtain the desired consent. I will mention two of the many valuable lessons which I learned in this way.

#### Drainage.

I am still a firm believer in drainage in the presence of infection or when the peritoneal cavity has been contaminated by pus; it must, however, be used with understanding.

I learned from *post mortem* examinations that packing with gauze according to the technique of Mikulicz, which was highly extolled in a recent debate at the British Medical Association, was disastrous. The gauze excites an outpouring of lymph, which cannot drain away owing to the saturated, cork-like mass formed by the gauze, and therefore remains to act as a culture medium for germs.

<sup>1</sup>An address delivered at the opening of the operating theatres of the new wing of the Sydney Hospital on October 23, 1930.



Gauze may be used in the presence of a slight general ooze from raw surfaces in the pelvis, but not as a pack. A thin strip of gauze, on the stretch, should be passed through an opening made in the floor of Douglas's pouch into the vagina, with the object of draining away the oozing blood for an hour or two and subsequently remaining to maintain the opening, through which the finger may be passed to evacuate any infectious fluid, should the patient's condition indicate its presence. This, however, is very rarely necessary. If the gauze strip is allowed to remain for eight to ten days, it can then be removed without pain or trauma.

When the upper reaches of the pelvis have been infected by a ruptured ovarian pus sac or ruptured appendix, a separate stab incision is made just external to the deep epigastric artery. Through this a split rubber tube is passed to the floor of the pelvis, hugging closely the lateral pelvic wall, so as to avoid the small intestines medially located. The tube is split so as to exercise minimum pressure on inflamed bowel; on no account is the tube to be "dressed with gauze," which acts like a cork. All that is necessary is a gutter along which intraabdominal pressure will force fluids, to be absorbed by frequently changed gauze squares.

#### Ileus.

The second great lesson which *post mortem* examinations disclosed was that ileus is more often mechanical than toxic. A coil of small intestine becomes adherent to a raw surface in the pelvis, becomes kinked, undergoes torsion and establishes obstruction.

The mechanical ileus comes on later than the fourth or fifth day (usually much later). The general condition is not serious at first, the abdomen is not tender and the temperature is not greatly raised.

If the surgeon can satisfy himself that he has to deal with mechanical ileus, he may try what I have named "succussion"—a method of overcoming obstruction in the pelvis which has given me two dramatic successes. The last, comparatively recently, was as follows:

The patient, after salpingectomy, was doing fairly well until the seventh day, when she began to vomit, became distended and failed to evacuate motion or flatus after two enemata. Removing my boots, I stood on the foot

of the bed, and lifting up the patient by the hands passed under the knees, stood her on the back of her neck and gave her three vigorous up and down shakings. The foot of the bed was then raised on two chairs and a large enema of soapy water with turpentine given. This acted well immediately and the recovery subsequently was easy.

In another case I was not sure of the diagnosis, and with the patient under ether anaesthesia through a fresh paramedian incision I passed my hand down into the pelvis, felt and lifted up an adherent distended coil. I did nothing else and subsequently all went well with the patient.

These and other lives I consider were saved by what was learned at post-operative *post mortem* examinations.

In septic paralytic ileus I have had three successes by reaching the most distended coil of small intestine through a small paramedian incision, making a purse string suture, opening into the intestine (clamped by fingers above and below),

passing a small, fairly stiff drainage tube through the opening, suturing the tube to the margins with a very fine catgut, pushing it further in to invert the edges of the opening, tying the purse string around the tube, passing and tying another purse string suture and allowing the intestine to fall back without suturing it to the parietes. The tube is then sutured to the skin with silkworm gut so that it cannot be accidentally dragged out of the intestine. The tube comes away on the eighth or ninth day, by which time a

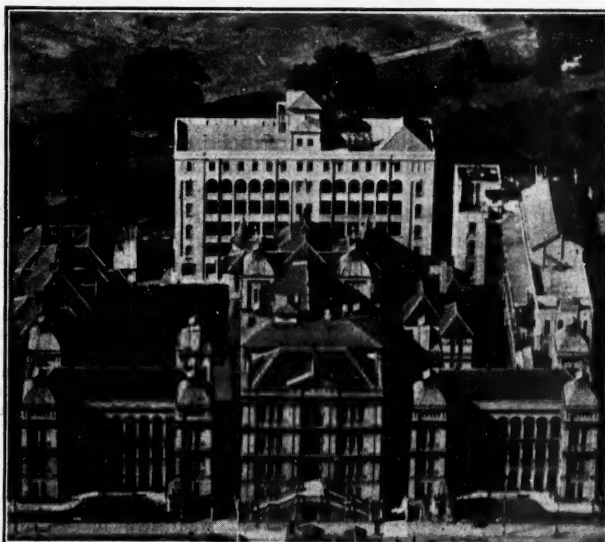
track enclosed by lymph has formed; this closes in several weeks. These patients were desperately ill and remained in hospital for eight to thirteen weeks. All did well eventually with spontaneous closure of the fistulous opening.

#### Desperate Cases.

Sometimes opening the abdomen discloses such complications, such a tangle-up that the condition seems hopeless, but we must never abandon hope. To use a phrase which I coined many years ago, we should "beat a Xenophonian retreat," that is, so act that with the help of Nature the patient may have a chance, however small it may at the time appear.

#### Hysterectomy.

The operation today is total hysterectomy by the method which I evolved some seventeen years ago and first performed on June 14, 1914, publishing



Sydney Hospital from the air-liner *Canberra*, showing the Travers Pavilion at the back. (Taken by Dr. George R. Hamilton.)

the technique and first series of cases in the *American Journal of Obstetrics and Gynecology* for 1917.

I had become dissatisfied with the results of subtotal hysterectomy, owing to the frequency with which women after this operation still complained of discharge, hæmorrhage and general ill health, due to the septic focus in the retained cervix; also the tragedy of cancer developing was, and is, quite common. Of this I published instances in *THE MEDICAL JOURNAL OF AUSTRALIA* for June 22, 1917.

Many surgeons throughout the world have published similar sad experiences, so that the danger of cancer developing is now fully recognized; but what is not universally known is that there is a technique for total hysterectomy which, while banishing all danger of cervical cancer, is as easy and safe as that for subtotal, one which does not shorten the vagina nor interfere with the keystone of the vaginal arch and which leaves intact the utero-sacral ligaments and the endopelvic fascia attachments.

The after-results of this operation are comparable to those following successful prostatectomy; the patient seems to take a new lease of life.

A factor in this sense of well-being is that the ovaries are always preserved unless the woman has passed the menopause.

Insomuch as radium, in addition to the impossibility of diagnosing all contraindications, atrophies the ovaries, leaves untouched the septic focus in the cervix and affords no security against the subsequent development of cancer, it must be held to be altogether inferior to the modern total hysterectomy for non-malignant conditions.

I have performed this operation five hundred and eight times with three deaths. Dr. Cedric Bowker has assisted me in the majority and I wish to acknowledge my indebtedness to him.

#### ANÆSTHESIA FOR OPERATIONS ON THE BASE OF THE BRAIN.

By GILBERT BROWN, M.B., Ch.B. (Liverpool),  
Adelaide.

It has been my privilege to administer the anæsthetic to a number of patients on whom Sir Henry Newland has operated for the relief of surgical conditions at the base of the brain and to whom he referred in a very interesting paper read at a meeting of the South Australian Branch of the British Medical Association on November 27, 1930. I have also administered a few anæsthetics for other surgeons at similar operations. I have looked through my blood pressure charts for the last nine years and find that they include blood pressure records of 32 patients on whose Gasserian ganglion some operation was performed, 21 on whom cerebellar explorations were performed and nine patients who were operated on for pituitary tumours, a total of 62 patients. Seven but these have not been included, as they were not

charted and so cannot be considered to have been properly observed.

The four chief dangers in these operations are the anæsthetic, hæmorrhage, shock and interference with the respiratory centre. It is chiefly to the problem of the anæsthetic that I wish to refer, though the other three complications are closely connected with it. The anæsthesia is always long, sometimes more than four hours, and has certain features that are not present in other operations. The position is unusual, the patient is sitting in a chair for operations on the Gasserian ganglion, prone with the head over the end of the table for cerebellar tumour operations and with the neck hyperextended for pituitary exploration. In every case it is impossible for the anæsthetist to examine the eyes or handle the jaw and tongue for some hours after the operation has begun.

Ether was the anæsthetic used in all these operations. The endopharyngeal method was employed in 22 instances and the endotracheal method in the last 40. The reason for the change of technique was that the endotracheal method permits complete control of the airway; and by shutting off the ether the machine becomes a very efficient means of giving artificial respiration. This is most important, as the patient may be in a position which allows mechanical obstruction to the breathing, and also the respiratory centre may be interfered with by the manipulation of the brain or by the changes caused by the anæsthetic itself. On two occasions the respiration has ceased just at the end of induction.

CASE I. Blood pressure chart 979 of August 11, 1930. Mr. W., aged fifty years, was operated upon by Sir Henry Newland for excision of a cerebellar pontine tumour. He was anæsthetized by the open method in seven minutes and required eight cubic centimetres of ethyl chloride and fifteen cubic centimetres of ether. Just as full anæsthesia was obtained the respiration stopped, the face became dusky and then definitely cyanosed. A catheter was passed into the trachea and air was blown through it into the lungs from a Connell's ether apparatus. The colour at once became good and respiration was resumed. The patient was then placed in position and the operation begun. The entire tumour was removed and the patient returned to bed in good condition after an operation lasting four hours. Convalescence was uneventful and the recovery was excellent.

#### Technique Employed.

Anæsthesia is induced with ethyl chloride and ether by the open method with the head raised on one or two pillows. An endotracheal catheter is then passed and fixed by a suture to the corner of the mouth. Strapping is unsatisfactory for this purpose, as it may be detached by becoming wet with perspiration or blood. The narcosis should be as light as possible, only sufficiently deep to prevent coughing and movements. It is necessary to remember that the anæsthesia is deepened as soon as the dura is opened, the reason being that the decreased tension causes an enormous increase of blood flowing through the brain. The ether may usually be turned off before the operation is completed and then air is blown into the lungs so that other anæsthetics were given for similar conditions. The ether may be "washed out." The reflexes should

have returned by the time that the dressings are applied. Any change of position should be made very gradually so that the respiratory centre may not be affected.

The anaesthetist has a second duty to perform which is quite as important as preventing the patient from feeling pain. He must keep an accurate record of the condition of the patient throughout so that he may be able to inform the surgeon when shock is supervening. Then restorative measures may be employed or the operation stopped, the wound closed and the operation completed at a later date. Unfortunately, the closure of the wound is often a very lengthy proceeding and so the shock may be profound before it is completed. It would be better to give an intravenous infusion of blood or gum solution and finish the operation. There is little doubt that more of these patients would have survived if this method had been employed. This is well illustrated by the following history.

CASE II. Blood pressure chart 685 of April 23, 1928. R.G., aged eighteen years, was operated upon at the Adelaide Hospital by Sir Henry Newland for a cerebellar tumour. While the neck muscles were being detached there was considerable hæmorrhage and the systolic blood pressure fell 40 millimetres of mercury. During the next forty minutes the systolic pressure gradually fell to 58 and the diastolic to 36 millimetres of mercury, while the pulse rate increased to 132 per minute. At this time the cerebellum was accidentally lacerated; for the next fifteen minutes it was impossible to count the pulse or record the blood pressure. Respiration was very shallow and the patient became cyanosed in spite of oxygen administration. The operation was rapidly completed and at the conclusion the pulse rate was 132 and the blood pressures 55 and 34 millimetres of mercury respectively. Probably a transfusion of blood earlier would have prevented the death.

The following histories illustrate normal and abnormal conditions during these operations.

CASE III. Blood pressure chart 22 of June 22, 1922. J.H., aged fifty years, was operated upon by Dr. Newland for *tic douloureux* by division of the fifth nerve proximal to the Gasserian ganglion. The duration of the operation was two and a half hours, but there was very little bleeding, so that the circulatory depression was slight, as is shown by the record.

Before operation the pulse rate was 138 per minute, the systolic blood pressure was 120 and the diastolic 80 millimetres of mercury. After operation the pulse rate was 90 per minute, the systolic blood pressure 98 and the diastolic 70 millimetres of mercury.

CASE IV. Blood pressure chart 878 of October 5, 1929. Mr. P., aged eighty-five years, was operated upon by Sir Henry Newland for *tic douloureux* by the same method as the last patient except that the first part of the operation was performed under local anaesthesia; ether was given later. Unfortunately, in dividing the nerve the carotid artery was divided and there was much hæmorrhage until the wound was plugged. The pulse rate immediately rose from 80 to 108 per minute and the systolic blood pressure fell from 100 to 80 millimetres of mercury and the diastolic from 60 to 50. The operation was rapidly concluded and the patient returned to bed. An hour later an attempt was made to remove the plugging, but hæmorrhage recurred and the patient died.

CASE V. Blood pressure chart 308 of November 20, 1924. Miss L., aged sixty-six years, suffered so acutely from *tic douloureux* that an attempt was made to relieve her in spite of the fact that she had a systolic blood pressure of 210 millimetres of mercury and a diastolic pressure of 98 millimetres, an enlarged heart with a systolic murmur, and albuminuria. As soon as she was placed in the sitting position her systolic blood pressure dropped eighty milli-

metres of mercury and after a slight rise fell steadily, until forty minutes later it was only 90 millimetres of mercury. The respiration then became shallow and irregular. The operation was stopped and the head lowered; stimulants were given, but the respiration failed and the patient died on the table. Endotracheal anaesthesia was not used in this case, as I did not know the nature of the operation until the patient came into the operating theatre and so the catheters were not available. Possibly the sitting position increased the load on the heart and should have been abandoned. However, the heart was so damaged that it was unable to stand the strain.

CASE VI. Blood pressure chart 561 of November 8, 1926. Mr. H., aged forty years, was operated upon by Dr. Newland for a pituitary tumour. A transfrontal operation was performed and a pituitary cyst evacuated; the patient made an excellent recovery. The circulatory depression was rather less than usual.

CASE VII. Blood pressure chart 1031 of November 25, 1930. Mr. L., aged thirty-nine years, was operated upon by Dr. R. H. Pülleine for a pituitary tumour. A trans-sphenoidal decompression was performed and a portion of the growth removed for examination. There was very little bleeding and the circulatory depression was small. The systolic blood pressure fell 28 millimetres of mercury, while the diastolic pressure and pulse rate were unchanged.

#### The Choice of an Anaesthetic.

Ether was used in these sixty-two operations, but it has the disadvantages that it is a tissue poison, it is eliminated slowly and may be followed by vomiting and acidosis. In many other surgical operations it has been found that better results may be obtained by the administration of the gas anaesthetics, local anaesthesia, "Sodium Amytal," "Avertin" or a combination of these methods. I have used nitrous oxide and oxygen in an operation for subtemporal decompression with good result.

CASE VIII. Blood pressure chart 646 of November 23, 1927. Mrs. M., aged thirty-one years, was suffering from symptoms that suggested tuberculoma of the brain; lumbar puncture was required at frequent intervals. As complicating factors she was suffering from pulmonary tuberculosis, had a pneumothorax and was recovering from pyelitis. Nitrous oxide and oxygen anaesthetic was administered while a subtemporal decompression was performed. The pulse rate and blood pressures were scarcely altered by the operation and the patient made a good recovery.

The expense of the gas anaesthetics limits their application in operations lasting four hours or more. Cushing uses local anaesthesia, sometimes combined with ether. Other surgeons have used intravenous injections of "Hedonal" and of "Sodium Amytal" or rectal injection of "Avertin." Probably the ideal method will be found to be a combination of "Sodium Amytal," local anaesthesia and a gas anaesthetic given by the endotracheal method.

### Reports of Cases.

#### RESUSCITATION BY CARDIAC STIMULATION.

By DONALD STEWART, M.B., B.S., (Melbourne),  
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Clinical Assistant to Out-Patients, The  
Children's Hospital, Melbourne.

IN THE MEDICAL JOURNAL OF AUSTRALIA of January 17, 1931, under the heading of "Current Comment" an interesting review of resuscitation by cardiac stimulus was given.



Notwithstanding that many cases have been reported in which an inanimate heart has recommenced beating in response to cardiac stimulation, I have not been able to find detailed observation of any such case. The following brief notes indicating something of the mechanism of the awakening of the heart may therefore be worthy of record.

In August last I was called to see a *primipara* three weeks over time, to find that the membranes had ruptured and abundant meconium had accompanied the waters. The presentation was left occipito-anterior and the *os uteri* was practically fully dilated. Forceps were applied, episiotomy done and the baby gently delivered. The cord had ceased to pulsate and no heart sounds could be heard. All the usual means of resuscitation and artificial respiration by compression and mouth-to-mouth breathing produced no result. Fifteen minutes after birth, 0.2 cubic centimetre (three minims) of adrenalin solution was injected into the left ventricle of the heart. Within two minutes, faint regular heart sounds at a rate of thirty per minute were detected. The sounds strengthened to apparently normal force, still at the same rate. The stethoscope was lifted for a few moments and when it was reapplied the heart was heard beating regularly at a rate of 110 per minute. Although artificial respiration was maintained, natural breathing failed to commence, and the heart beats became fainter and fainter though they still maintained about the same rate. Within ten minutes of commencing they ceased.

#### Comment.

In view of the probable cerebral damage from absence of circulation, failure to resuscitate was perhaps not unfortunate. The previously mentioned article states "the first contractions of the apparently inanimate heart after the application of suitable stimuli are in the nature of extra-systoles." In this instance no extra-systoles were noted; but they may have occurred in the ventricle, which then began to beat at its own rate for two minutes, gathering power with each contraction. The stimulus of the ventricular contractions next awakened the heart's usual pace-maker, and normal rhythm was inaugurated. This condition was maintained until the heart ceased to beat.

I have never had occasion to use cardiac stimulation in what must be its widest field—cessation of the heart during anaesthesia—but this example impressed me with the potency of the method. Presumably in all cases the same order of awakening will occur, namely: (a) Extra-systoles arising from the stimulated point; (b) regular ventricular contractions; (c) normal rhythmic heart beats, the impulse commencing in the sino-auricular node and sweeping in turn to the auricles, the auriculo-ventricular bundle and the ventricles.

#### Summary.

(1) After more than fifteen minutes' complete cessation, the heart of a newly born baby began to beat within two minutes of an intraventricular injection of adrenalin, exemplifying the potency of cardiac stimulation of the inanimate heart.

(2) The initial rate of contraction was thirty per minute.

(3) After two minutes the rate suddenly increased from 30 to 110 per minute. This rate persisted until the heart ceased to beat.

#### CAROTENÆMIA (BIOCHEMICAL NOTES).

By J. V. DUHIG,

Director, Brisbane and District Laboratory, Hospital for Sick Children, Brisbane.

It is now known with certainty that certain pigments associated with the fats of animals and plants—lipochromes belonging to the chemical group of carotenoids, or as Palmer<sup>1</sup> prefers to call them, chromolipoids—may accumulate in the blood to such an extent as to impart to the skin and subcutaneous fat an abnormally deep pigmentation, from pale lemon to deep orange. In certain con-

ditions associated with defective fat metabolism and excess fat storage this accumulation may become enormous, as in the case under review. *Diabetes mellitus* and malnutrition are two such conditions.

It was formerly believed, mainly on German authority, that these pigments were endogenous. It is now believed, however, that they are mainly exogenous in origin, being identical with the fat-soluble pigments of plants and absorbed into the body with vegetable foods. Considerable doubt still exists as to the exact nature of the lipochromes in general and of carotene in particular. This difficulty probably arises from the confusion in interpretation of microchemical findings with regard to the lipoids. In an admirable experimental study, in which is a good review of the literature, Connor<sup>2</sup> attempted to distinguish carotene, xanthophyll, cholesterol and other lipoids from one another. Amongst other findings, two of his conclusions were: (i) "Carotene and xanthophyll, the two common lipochromes, do not stain by any of the fat stains ordinarily employed to differentiate them"; (ii) "when a pigment is present in tissues associated with a substance which takes a specific stain for fat, this pigment may be assumed to be a lipochrome, but this is not invariably so." Lipochromes are probably crystalline substances which often absorb stains used to identify the lipoids in which they are dissolved. In a previous paper<sup>3</sup> this author, investigating the possible toxic action of the pigment, states that carotene is an unsaturated hydrocarbon ( $C_{40}H_{56}$ ), relatively inert chemically and soluble only in powerful lipid solvents. For a long time it had been suspected that vitamin A was in some way associated with carotene, if not identical with it. Recent evidence strongly supports this hypothesis. Collison, Hume, Smedley-MacLean and Smith<sup>4</sup> found that the vitamin A substance in green celery and cabbage and in carrots is contained in the most highly unsaturated fraction of the unsaponifiable matter and remains associated with the carotene crystals. They note in passing (Hume and Smith, unpublished work) that there seems some reason to assume that a carotene-containing extract is active only when dissolved in fat.

Ahmad<sup>5</sup> finds that the greater part of the oil of a diatom, *Nitzschia closterium*, is probably due to carotene, synthesized by the organism and extracted with the oil.

Capper<sup>6</sup> has shown that the vitamin A spectrum band in body fats is probably due to a synthesis of this substance from carotene, and presents evidence in favour of the conversion of carotene to vitamin A. This raises the question as to whether carotene is toxic of itself or is likely to produce hypervitaminosis after synthesis as vitamin A.

Wells and Hedenburg<sup>7</sup> concluded, as it happened, correctly, that "any such quantities of carotene as can ever accumulate in the tissues have no harmful effects." Their findings, however, were based on the supposed presence of carotene in the urine, whereas this substance is not soluble in urine unless dissolved in a lipid, and their experimental method was hardly designed to extract it in anything like a state of purity.

Hess and Myers<sup>8</sup> by subcutaneous injections into infants, produced no local lesion, but the subjects passed a yellow urine up to forty-five minutes after injection of carotene in olive oil. This work is open to the same objection as that of Wells and Hedenburg. Up to the time of Connor's first paper<sup>2</sup> these seem to have been the only experiments on the subject. Connor assumed from experiment that carotene would behave in the tissues as a non-toxic, non-diffusible, slowly absorbable substance, forming a characteristic foreign body type of reaction. He used guinea-pigs and rabbits, which might react to carotene differently to humans, though this seemed hardly likely. Intraperitoneal injections into guinea-pigs produced granulomatous lesions of the familiar foreign body type. Intravenous injection into rabbits produced no effect.

Though there is no demonstrable carotene in the blood of rabbits and guinea-pigs, the adrenals and liver of these animals do contain it, so that, though from all points of view these animals are not strictly comparable to humans in this matter, the experiments quoted above do

have some value. It seems, then, that so far no toxic effect on animal tissues has been observed to result from an excess of carotene either of itself or as a vitamin which might reasonably be assumed to be synthesized in great excess from carotene.

In the human, carotene is normally present in the adrenals, liver and *corpus luteum* and may or may not be present in the blood. The amount in the blood seems to vary with the intake. It has been shown by numerous authors to be present in excess in the blood of diabetics, especially if they suffered from lipæmia. Connor,<sup>(4)</sup> using a method based on that of Willstätter and Stoll,<sup>(5)</sup> found the range of the blood carotene content of thirty-six specimens to be 0.02 to 0.11 milligramme per hundred cubic centimetres and in diabetic bloods (eighteen specimens) from 0.05 to 0.16 milligramme per hundred cubic centimetres. He quotes Van den Bergh, Müller and Broekmeyer, who found 0.4 to 1.34 milligrammes per hundred cubic centimetres in normal blood and 0.45 to 1.9 milligrammes in diabetic blood. In this work Connor, curiously enough, omitted to estimate the blood fat content of his subjects. I believe that carotenæmia depends very simply on carotene intake and blood fat content. The difference in the figures of Connor and of Van den Bergh and coworkers is to be found in the higher vegetable intake of the latter's subjects.

In the case in which my investigations were carried out the diagnosis was made by Dr. Russell, to whose interest and kindness I am indebted for the chance of presenting this material. The patient is a diabetic and her obviously abnormal pigmentation attracted her doctor's attention.

Using Connor's method, Miss Fitzgerald, in this laboratory, found the carotene of the patient's blood to be twenty-four milligrammes per hundred cubic centimetres. This is an enormous amount and might raise incredulity, but after extraction from the serum and being diluted again with its own volume of the solvent, the test solution gave a colorimeter reading of 3.6 with a standard of high concentration set at 20. The standards used were those of Willstätter and Stoll. Since the blood cholesterol is a simple function of the total lipoids, these were roughly estimated as cholesterol. This was present in the blood to the extent of 690 milligrammes per hundred cubic centimetres, a huge amount and quite sufficient to explain the high carotene content. Vegetable starvation will, of course, reduce the amount, and it is interesting to speculate about the fate of the pigment. That, however, is a matter for further investigation.

We identified the pigment as carotene by the characteristic absorption band observed in the spectroscope. Owing to lack of the reagent we could not try its reaction with antimony tri-chloride.

#### References.

- <sup>(1)</sup> L. S. Palmer: "Carotinoids and Related Pigments."
- <sup>(2)</sup> C. L. Connor: "Studies on Lipochromes: Reaction of Animals to Presence of Carotin," *American Journal of Pathology*, May, 1928.
- <sup>(3)</sup> C. L. Connor: "Studies on Lipochromes: Identification of Carotin, Xanthophyll and Associated Lipoids in Tissues," *American Journal of Pathology*, May, 1928.
- <sup>(4)</sup> C. L. Connor: "Studies on Lipochromes: Quantitative Estimation of Carotin in Blood and Tissues," *Journal of Biological Chemistry*, May, 1928.
- <sup>(5)</sup> D. L. Collison, E. M. Hume, J. Smedley-MacLean and N. H. Smith: "The Nature of the Vitamin A Constituent of Green Leaves," *Biochemical Journal*, Volume XXIII, 1929, page 634.
- <sup>(6)</sup> B. Ahmad: "Observations on a Diatom as a Source of Vitamin A," *Biochemical Journal*, Volume XXIV, 1930, page 860.
- <sup>(7)</sup> N. S. Capper: "Carotene and Vitamin A. The Transformation of Carotene into Vitamin A as shown by a Study of Absorption Spectra of Rat Liver Oils," *Biochemical Journal*, Volume XXIV, 1930, page 980.
- <sup>(8)</sup> H. G. Wells and O. F. Hedenburg: "The Toxicity of Carotin," *Journal of Biological Chemistry*, Volume XXVII, 1916, page 213.

<sup>(9)</sup> A. F. Hess and V. C. Myers: "Carotinæmia: A New Clinical Picture," *Journal of the American Medical Association*, Volume LXXIII, 1919, page 1743.

<sup>(10)</sup> Willstätter and Stoll (quoted by Connor): "Untersuchungen über Chlorophyll," 1913.

## Reviews.

### A BOOK ON EXERCISE.

OUR present democratic age has been characterized by increased leisure for the masses and, therefore, a more lively interest and participation in many of the forms of sport. In spite of the gloomy forebodings of those pessimists who seem to delight in talking and writing of our "C3-ness," the cult of the body is now a very real factor in our national life. It is therefore singularly appropriate that Dr. Adolphe Abrahams should publish his interesting little book on exercise.<sup>1</sup>

The book is not in any sense a medical text book. The opening chapter deals with the physiology and, most importantly, the psychology of exercise. The style is clear, concise and lucid and the author's views should be quite easy and simple for even the most unintelligent of laymen. There are chapters on walking, running, horse-riding, golf, cycling (evidently for the benefit of the late Victorians who are still with us) and swimming. The merits and disadvantages of each are competently dealt with.

Dr. Abrahams has very definite ideas on the question of exercise for women and even at the risk of being accused of sex injustice, he deplores the violent nature of much of the present day exercise for girls. And he adds: "But even if the modern girl sneers at her early Victorian predecessor with her clinging, her vapours and her horrified reluctance to stimulate her perspiratory glands, it must after all be conceded that she produced some very fine sons."

When doctors are called upon to prescribe exercises for their patients, they frequently foist their own particular likes upon them. This book will tend to correct this common but natural tendency.

### THE MECHANISM OF SENSATION.

AMONG the problems which have occupied the minds of neurologists, those occurring in the field of peripheral neurology have attracted a great deal of attention and not least among these are those connected with sensation and the mechanism of sensation. In "Sensation and the Sensory Pathway" Professor Stopford has attempted to give a comprehensive account of our present knowledge of the structure and function of the sensory pathway and to give an interpretation of the clinical observations made on patients suffering from defects of this mechanism. The interpretations which the author submits, are the result of personal researches during the past fifteen years and in their support it is contended that they explain and correlate all the principal clinical facts and are in absolute agreement with the knowledge elicited by studies in comparative anatomy and researches into the evolutionary history of the nervous system.

The first two chapters of the book deal in a very thorough manner with an account of the sensory disturbances and recovery following division and suture of peripheral nerves, with special reference to Head's classical experiment and deductions. This is followed by a chapter on the innervation of the hand, in which the author attempts to establish certain general principles of sensory innerva-

<sup>1</sup> "Exercise, its Functions, Varieties and Applications," by Adolphe Abrahams; 1930. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 100. Price: 3s. 6d. net.

<sup>2</sup> "Sensation and the Sensory Pathway," by John S. B. Stopford, M.D., F.R.S.; 1930. London, New York, Toronto: Longmans, Green and Company. Demy 8vo., pp. 156, with illustrations.

tion of peripheral structures. As a result of his own researches and from a critical survey of the work of other investigators in this field the author replaces Head's classical division of the sensory mechanism in peripheral nerves into three systems, namely, epicritic, protopathic and deep sensibility, by another division which he claims is much more useful, namely, into two groups which represent the two stages in recovery seen during regeneration and which have their central representation in the thalamus and cerebral cortex respectively. These are, first, a group of elements which recover early and represent the affective aspects of sensation and are those necessary for protection and mere awareness, and, secondly, a group of elements recovering later and less completely, which include the higher forms concerned with spatial relationships, discrimination, comparison and estimation of intensity. It is further pointed out that such a division makes it less difficult to understand why a longer period must elapse before the fibres subserving the cortical forms of sensation function correctly than the period required for the fibres concerned with the thalamic aspects of sensation, since a very much more complex readjustment and reeducation must occur after regeneration of the fibres in the former case than in the latter.

With regard to the more difficult question, namely, how degeneration and regeneration affecting only the primary or peripheral sensory neurones should cause such a profound disturbance of the cortical functions, he points out that this can be explained by the inevitable disturbance of the intraneural anatomy of the nerve trunk, with consequent crossing of fibres having different functions when regeneration occurs. This also explains the incompleteness of the second stage of recovery which is a constant occurrence after secondary suture, and also explains the phenomenon of reference.

A chapter is given to the vexed question of the specificity of end organs, and the author summarizes present knowledge by stating that from clinical and experimental observations and by analogy, it appears most probable that there are specific receptors for sensation, but there is at present no absolute and definite proof of their existence.

It is impossible in a small space to do any more than indicate briefly a few only of the important conclusions arrived at in the work. It is thorough, authoritative and a very worthy product of one of the foremost British anatomists and should be read by every anatomist, physiologist and clinician.

#### ENTOMOLOGY.

"INSECTS, TICKS, MITES AND VENOMOUS ANIMALS OF MEDICAL AND VETERINARY IMPORTANCE,"<sup>1</sup> by Patton and Evans, is a volume of marvellous industry comprising 786 pages with 60 plates and 374 figures.

The text book has been designed to cover the Diploma of Tropical Medicine Course at the Liverpool School, University of Liverpool. It is divided into twenty-eight sections, or "meetings" comprising twenty lectures and sections dealing with laboratory work. Though it has been written from the standpoint of the requirements of the Liverpool School and frequently contains such statements as "Please do not move the slide" *et cetera*, this does not detract from its usefulness to other schools of tropical medicine.

In a short introduction the authors outline to the student the scope and method of his work. The student is taken by easy stages through such subjects as classification, morphology, external and internal anatomy, bionomics, relation to disease, control of "parasitic" arthropods and the vectors of disease.

One misses in this work, which has been developed on more modern lines, the leisured style of the "Text Book

of Medical Entomology" (1913) by W. S. Patton and the late F. W. Cragg. The time limit influence of the lecture theatre is felt to some extent when going through the book which is unfortunate, for medical entomology is perhaps the most difficult subject for the Diploma of Tropical Medicine course, as it is entirely or almost new to the student.

The book is a wonderful storehouse of information written in a plain, straightforward and convincing style which compels the interest not only of the student, but also of the medical entomologist.

The volume is, in some respects, revolutionary in dealing with the subject matter. Two suborders, only, of the Diptera are recognized—Orthorrhapha and Cyclorrhapha—the Pupipara being classified as subfamilies of the Muscidae Calypterata. The family Estridae has been reduced to the rank of various subfamilies of the Muscidae Calypterata, being placed in what is believed to be its natural position.

The illustrations, the majority original, show great discrimination of selection and beautiful execution. The fulness of their lettering and explanation will be of the greatest service to the many readers which the book will find. It would be invidious to mention any illustration in particular, but a word of praise must be given to Miss M. Brown for her great photographic skill.

The graphical representation of the relationships of the Phylum Arthropoda at the end of the book is excellent and very helpful.

There is, most unfortunately, no table of contents. The alphabetical index takes in pages 771 to 785 and on the whole is good though it has its faults, thus to find hypopygium we are told to see terminalia, only to find that the latter is not indexed; some words are also misplaced, for example, *Termes lucifugus* and *Trichoptera* should follow Temple and *Trichomyia* respectively.

The authors have wrought a great service in the making of this book which will undoubtedly be the leading text book on medical entomology for many years to come. We wonder how such a book with its wealth of illustrations can be published for the modest price charged.

#### DIET IN THE TROPICS.

THE need for a work of reference on such an important subject as native dietaries has long been felt by those who have to undertake the medical supervision of native hospitals, gaols and compounds. The publication of "Dietetics in Warm Climates" by such an authority as J. Neil Leitch will go far towards remedying this deficiency.<sup>1</sup>

After interesting preliminary chapters in which the influence of diet on the psychology of the race is touched upon, the author reviews fairly fully tropical dietaries and foodstuffs. This is followed logically by a review of the caloric value, chemical constitution and vitamin content of tropical foods. Finally those diseases associated with defective dietaries and food intoxications and poisonings are dealt with. These latter chapters should be of considerable value to anyone in administrative control of natives and should supply abundant material for thought and perhaps future action.

Conditions in Australia and her dependencies receive, as is but natural, scanty attention; this, however, may be remedied in the future.

The book should be in the library of all medical officers in charge of natives. It should also prove of real value to higher military officers and managers of large plantations.

While the book is well bound and printed on good paper, the practice adopted of inserting advertisements at the end of each chapter will not commend itself to many medical readers.

<sup>1</sup> "Insects, Ticks, Mites and Venomous Animals of Medical and Veterinary Importance; Part I, Medical," by W. S. Patton, M.B., Ch.B. (Edinburgh), F.E.S., and A. M. Evans, D.Sc.; 1929. Croydon: H. R. Grubb, Limited. Crown 4to., pp. 796, with illustrations. Price: 20s. net.

<sup>1</sup> "Dietetics in Warm Climates, Including Foodstuffs, their Analyses and Role in Disease," by J. Neil Leitch, M.D., B.S., F.R.C.S., L.R.C.P., D.T.M. & H., F.R.G.S., F.Z.S., with an Introduction by Sir J. A. Byrne, K.C.M.G., K.B.E., C.B.; 1930. London: Harrison and Sons Limited. Royal 8vo., pp. 486. Price: 25s. net.



## The Medical Journal of Australia

SATURDAY, FEBRUARY 28, 1931.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

### BRANCH MEETINGS.

THE several Branches of the British Medical Association in Australia hold regular meetings for the discussion of scientific subjects. In so doing they are acting in conformity with the primary object of the Association. Since it is not regarded as ethical for a medical practitioner to disseminate his views on the causation of disease or its treatment through the medium of the lay press, or to blazon abroad his successes with certain medications or with elaborate operative procedures to the general public, it necessarily follows that he should be given an opportunity of delivering his message to his brother practitioners; it is demanded of every scientific worker that he give to other workers the results of his investigations, that he explain the method by which his results have been obtained, and that he be prepared to submit his results and his deductions therefrom to the scrutiny of others. If a medical practitioner has a message to deliver, he should be given an opportunity of declaring the faith that is in him. Most of the Branches of the British Medical Association have committees deputed to arrange the programme of scientific meetings. They recognize the facts just stated and endeavour to satisfy the demands of the

man with a message. When the members of the Branch foregather to hear a paper read they are given an opportunity of discussing the subject. A discussion is defined as an "examination by argument," "a debate" and also as "consumption with enjoyment of food." Presumably then a subject may be assimilated mentally when it is debated, and enjoyed as a mental refreshment. The first essential in a debate on a scientific subject, or indeed on any subject, is that the debater confines his remarks to the subject of the moment. Red herrings as an "entrée" or a "savoury" at the intellectual feast are not allowed. After those present have had their say, the original speaker, the man with a message, is allowed to defend his case, to reply to his critics, in short to have the last word. In this way opportunity can be given to others to test new methods and to apply in their work what to them are new views. There is no doubt that useful additions are thereby made to knowledge.

The work of a committee deputed to draft a programme of meetings and the task of a chairman at a discussion are not so simple as they appear. Those who offer papers and those who discuss them have not always a message to deliver. The writer of a paper may imagine that he has a message or he may be a rank advertiser whose contribution is a rehash of the opinions of others served with a sauce of his own impressive personality; his paper may be pure nonsense. In the last-named circumstance the committee has or should have no difficulty in refusing the proffered morsel; in the two first the decision may be not easy. The sauce may be of such a caviare quality as to make the dish palatable; but on the other hand, both sauce and substance may be either of indifferent or doubtful worth. At the discussion the same holds good. Those with something to contribute should come forward and add their contributions to the repast. There are some, however, who would spoil the menu. It is difficult to keep them out. They come with their red herrings served on a charger. Some such, before they have heard the paper read, when they merely know the nature of the subject, come with a bundle of papers in a convenient breast pocket.

Later on they extract the bundle and proceed with great deliberation and in impressive tones to thank the reader of the paper and to deliver themselves of their screed. They wander freely from the points at issue—sometimes they scarcely touch them—and generally manage to introduce as an appropriate aside: "When I was in Vienna . . ." or "At the Mayo Clinic I saw So-and-so . . ." The chairman may appear to be foolishly lenient with such individuals, but again he does not wish to exclude some few words of wisdom that may emerge before the recital is finished, and so he allows the garrulous one to exceed the time limit.

The matter is of some, but not of insuperable, difficulty. As has been pointed out on several occasions, it is wise for Branch committees to invite contributions from recognized workers in certain spheres. This is being done in some of the Australian Branches. When it is known that great care is exercised and that requests are made for papers, the man without a message is probably more chary of coming forward. When a paper is offered, it is not sufficient that the subject be stated. The paper itself should be submitted to the committee or at least an outline of it should be given. In certain quarters the statement has been made by prominent people that some of the papers read before the Branches are of inferior quality. If this is so, the remedy is in the hands of the Branches themselves. At the present time all the papers read at Branch meetings are submitted to THE MEDICAL JOURNAL OF AUSTRALIA for publication. It has been suggested that this arrangement should be altered. This would probably not be wise. The check should come from the Branch committee, for it is undoubtedly a stimulus to authors for them to know that their papers will be published, and they realize that they may have their views attacked by a larger number of persons. At the Branch meetings the chairman should know the rules of debate and above all else he should refuse to allow irrelevant subjects to be introduced. When he sees that a miniature monograph is being opened for perusal, he should be prepared to enforce the time limit. He should have no great difficulty in the

majority of instances, for most of these people are known—the stimulus affects their speech centre at many meetings and the stimulus may be any subject in the whole range of the medical sciences. This is a matter for the serious consideration of all chairmen of Branch meetings. Men who could shed light on obscure subjects often remain silent for fear that they will be credited with motives similar to those obviously actuating the garrulous. Meetings of the British Medical Association are for serious scientific discussion and not for personal advertisement.

## Current Comment.

### THE THYMUS BODY.

STRICTLY speaking, there are two thymus bodies, a left and a right, bound together closely and considered as a unit. The size of the thymus varies relatively and absolutely with the age, sex and nutrition of the subject. It is largest at puberty, but relatively largest in infancy. It is larger in the female than in the male. As a result of severe illness it may undergo permanent involution, even though the patient has seemingly undergone complete recovery. In persons who have died of slow wasting disease it is usually small. The thymus arises from ventral diverticula of the third pharyngeal pouches. Its embryological relationship with the parathyroids is close and small masses of thymus are often found in close connexion with the parathyroids. The parathyroids are developed from the fourth pharyngeal pouches and may be embedded in the thyroid gland—the "internal thymus." The actual embryological relationship of the thymus with the thyroid, however, is not so close as with the parathyroids.

A. S. Kirkland<sup>1</sup> considers that children with thymic symptoms may be separated into three age groups: (i) Those who have difficulty in the first few hours of life; (ii) those whose difficulty appears in the early weeks of life, and (iii) those whose lives up to puberty are in peril from a persistently enlarged or hyperfunctioning thymus. He considers that the first group includes many still-born babies and others whose respiratory function is initiated only with great difficulty. Among his patients were some who from the first breathed with difficulty and were definitely and persistently cyanosed. Enlarged thymus was evident in almost all. Babies showing thymic disorders at birth, in addition to an increased thymus shadow on X ray examination, often have atelectasis. W. A. Evans has stated that in all cases of unilateral atelectasis the thymus is more enlarged on the side affected. Possibly this impedes proper aeration of the lung. The second group

<sup>1</sup> The Canadian Medical Association Journal, November, 1930.

displays great variations. There may be only cyanosis and difficulty in taking the breast. Convulsions, however, may occur, varying from twitchings of the facial muscles and fingers to more severe seizures. Cyanosis and dyspnoea increase during a convulsion and inspiratory stridor or "crowing" may occur. The breath may be held, or a characteristic brassy cry is uttered. The temperature may be elevated during a convulsion, but rapidly falls to normal. Occasionally during an acute attack the thymic child may be cold and clammy, flaccid and with death-like pallor. The respirations may be attended with stridor. They may be reduced to four a minute or even temporarily suspended. In the third age group are those whose danger is potential. These may succumb to seemingly trifling infection or they may die suddenly during general anaesthesia.

Friedleben concluded that the "thymus is not essential to life, but the thymus and spleen together are essential," and "death which follows the removal of these organs is one of wasting brought about by the failure in the positive blood formation caused by the cessation of their combined activities." A substance has been found in the thymus which causes convulsions on injection; but no true internal secretion has been traced to it. It is a fallacy to regard the thymus as a gland having endocrine function. The frequency of thymic enlargement is a matter on which are widely diverging opinions and different investigators, using X ray examination, have come to different conclusions. Liss found 42% of infants with large thymic shadows, while in Boston and New York the percentage was given as from 1.6 to 7.5. It is, however, impossible to assign any definite size or weight as normal for the thymus body. Nor is size the main consideration. Hypofunction or hyperfunction is the chief consideration. Mechanical obstruction alone, inducing pressure symptoms, is not the whole explanation. These pressure effects may be exerted on the veins, arteries and trachea. Anteriorly the thymus is in contact with the rigid sternum.

*Status lymphaticus* is the term used to describe the condition of persons with unstable thymus function. It is said to be six times more frequent in females than in males, but its recognition in the female is more difficult. Some observers deny the existence of such a condition as *status lymphaticus*. A full review of the condition was published in a special abstract in this journal on May 26, 1928.

As regards diagnosis, thymic enlargement is suggested in a young child who feeds with difficulty, who manifests cyanosis and dyspnoea, choking when it cries, or has inspiratory stridor or "crowing" and has convulsions. X ray examination is then indicated, but the normal size of the thymus is not known. If the shadow be definitely wider than that made by the vertebral column, especially if it be asymmetrical, extending over part of either lung field, it should be deemed abnormal. The contour of the shadow is of no significance. But a thymus scarcely seen by X ray examination may be

associated with serious symptoms and a huge thymus shadow may not be attended by any significant manifestations. Evidence of dysfunction is the main consideration. The expanding lungs of an infant, exerting pressure on the lateral aspects of the thymus may rapidly alter its size and shape. When an infant cries, the increased pressure exerted by the diaphragm may cause an increase in the thymus shadow. It must not be forgotten that a large mediastinal shadow on X ray examination may not be related to the thymus at all, but due to a congenital enlargement of the heart or to tuberculous mediastinal glands. It is stated that sudden death in children, without preceding symptoms, may be due to thymic disorder. Again, an enlarged thymus may be associated with vomiting and other symptoms suggestive of hypertrophic stenosis of the pylorus. Kirkland mentions radium applications and more particularly exposure to X rays as causing involution of an hypertrophied thymus.

There are some points of importance not touched upon in this article, for instance the association of enlarged thymus with exophthalmic goitre. In Graves's disease the thymus is almost invariably enlarged and has enormously dilated capillary sinuses. Scott Williamson regards the thymus as a detoxicating agent for the thyroid. Bircher has produced Graves's disease in animals by grafting portions of the thymus removed from persons suffering from that disease. In regard to *status lymphaticus*, G. Slot has expressed the opinion that it is associated with calcium deficiency and endocrine dysfunction. He suggests that before an anaesthetic is given to a suspected patient, parathyroid gland and calcium gluconate should be administered. J. Garland found that out of 1,564 autopsies at the Massachusetts General Hospital twenty-three showed enlarged thymus. Eleven of these survived the immediate effects of major operations and only one died during operation. Nine had had previous X ray examination and in only one was thymic enlargement suspected. Four may possibly have died from *status lymphaticus*, but in none was that diagnosis necessary to account for death. Doubt is cast upon the association of *status lymphaticus* and sudden death. Marine states that involution of the thymus is hastened by thyroidectomy and delayed by adrenalectomy. G. M. Slot has recorded massive collapse of the lung associated in two sisters with thymic enlargement. E. Esquivel describes seven cases of mumps complicated by enlargement of the thymus.

We do not yet know accurately the biology of the thymus. It would be of interest to ascertain from the Government pathologists in Australia the proportion of cases of suicide or of criminals meeting violent deaths who give evidence of the *status lymphaticus*. As no definite endocrine function has been established for the thymus, it is not possible in the present state of our knowledge to justify the oral administration of thymus gland for arrested development in children or in hyperthyroidism or in uterine inertia during parturition.



## Abstracts from Current Medical Literature.

### GYNÆCOLOGY.

#### Hydatidiform Mole and Chorionepithelioma.

C. NOVAK AND K. KOFF (*American Journal of Obstetrics and Gynecology*, October, 1930) discuss the ovarian changes in two cases of hydatidiform mole and two cases of chorionepithelioma; in one of these the pituitary changes were also noted. Statistics dealing with the association of multiple lutein cysts of the ovary with chorionepithelioma are not of much value, since they deal only with the obvious macroscopic lesions which, in the most striking instances, may be cysts of enormous size, whereas equally characteristic changes may be discovered after a careful histological study. Spontaneous retrogression of the ovarian lesion is the rule after removal of the hydatidiform mole. The apparent growth after removal of the chorionepithelioma is of a temporary nature only, usually followed by a spontaneous disappearance. The microscopic changes in the ovary are varied. The lutein cells may be derived from the *theca interna* cells or from the *stratum granulosum* or both. The characteristic changes produced in the ovary by the activity of the anterior lobe of the pituitary gland consist briefly of hyperluteinization and hyperæmia and exaggerated follicular activity or superovulation. This picture of hyperluteinization coincides with the finding in cases of chorioma. Long after the removal of the primary tumour the result of a test for pregnancy was still positive in a reported case; this is accounted for by the large amount of trophoblastic tissue in the secondary deposits and it is suggested that the pregnancy test may be of clinical use in testing for the complete removal of trophoblastic tissue. In the authors' patient who died from secondary deposits following chorionepithelioma, the pregnancy had been terminated at least four months previously. The microscopic examination of the anterior lobe of the pituitary in this case revealed typical pregnancy changes and this also is accounted for by the trophoblastic tissue in the secondary deposits. The anterior lobe of the pituitary gland is not only the motor of the ovary in its normal cyclical activity, but it is likewise the direct cause of ovarian changes in normal pregnancy and hydatidiform mole and chorionepithelioma. The underlying stimulus of the pituitary in turn probably emanates from the trophoblast.

#### Post-Salpingectomy Endometriosis.

JOHN A. SAMPSON (*American Journal of Obstetrics and Gynecology*, October, 1930) states that the repair of salpingectomy wounds provides the one exception to the law of normal healing of hollow viscera. In a large proportion of cases the growth of tubal epi-

thelium initiated by operative injury not only invades the tubal stump and structures adherent to it, but it may continue its growth long after healing has ceased. Careful study was made of the cornu and the first part of the isthmus of the Fallopian tube in one hundred of one hundred and four uteri of patients who had not previously been operated upon. Misplaced Müllerian mucosa was found in thirteen of the hundred cases and in four of these there was evidence of previous salpingitis. The next step was to examine the healing following salpingectomy in one hundred patients, forty-seven of whom had been subjected to a double salpingectomy, making a total of one hundred and forty-seven salpingectomy stumps examined. Healthy healing occurred in thirty-five only. Misplaced Müllerian tissue was found in one hundred and twelve. In three cases only the distal end of the stump was patulous. In six cases some portion of the intestinal canal had become adherent to the stump and had been invaded by sprouts arising from the stump. In four cases the ovary had been invaded and endometrial hamatomata had developed. In three cases endometrial tissue was present in the abdominal wall following ventro-fixation and tubal sterilization. The endometrial tissue was shown to have arisen from the tubal stump. In two cases ectopic pregnancy developed in a sprout at about the site of ligation of the tube for attempted sterilization. When post-salpingectomy endometriosis, "endosalpingiosis," is of slight extent, it is of scientific interest only. If confined to the tubal stump or the uterine cornu it is of no more significance than if it were of non-operative origin. When it extends beyond these limitations it becomes of clinical importance. Ten of the one hundred patients in this series were operated upon a second time solely on account of endometrial invasion of neighbouring structures, giving rise to symptoms necessitating the operation. A plea is made for greater care in the removal of the tubal stump. The author has been using a cautery for the past two years. Furthermore, he suggests that conservative surgery does not always conserve the health of the patient.

#### Local Sequelæ After Radium Treatment.

N. ASHERSON (*The Journal of Obstetrics and Gynecology of the British Empire*, Spring Number, 1930) who has been on the staff of University College Hospital as Radium Registrar, has reviewed the seven-year period, 1921 to 1928, during which 420 patients with pelvic lesions were treated with radium at the University College Hospital. Up to 1927 the average dose of radium treatment per patient with a non-malignant pelvic condition was 1,200 to 1,800 milligramme-hours, but during 1927 and 1928 the routine dosage of treatment with radium of malignant disease of the cervix was 10,000 milligramme-hours. With the advent of these big doses certain

sequelæ were found in both malignant and non-malignant conditions. Most of the complications enumerated were detected in women who were over forty years of age. The relation between age and dose of radium necessary to produce amenorrhœa is interesting. The younger the patient, the bigger is the dose necessary to produce amenorrhœa. Hence, the nearer the patient's age approximates to forty, the more likely is the big dose to produce its sequelæ. The following sequelæ were noted: Annular (hour glass) constriction of the vagina, atrophy of the *portio vaginalis* of the cervix, shortening and stenosis of the vagina, ovarian neuralgia, vaginitis, either purulent, adhesive or obliterative, radium burn of the vagina. Annular (hour glass) constriction of the vagina occurred in patients who were treated with doses varying from 2,500 to 3,000 milligramme-hours of radium. The constriction was apparently a fibrous ring which yielded slightly to firm pressure, caused by a fibrosis in the submucous tissues. Atrophy of the *portio vaginalis* has been found frequently. It is apparently due to a fibrosis of the surrounding tissues. Obliteration of the vagina by stenosis and shortening occurred in five out of twenty-seven patients with inoperable carcinoma of the cervix treated by doses between 5,000 and 7,000 milligramme-hours of the element. Ovarian neuralgia occurred in only one case of the whole series. As the pain went down the inner side of the thigh to the knee, following the geniculate branch of the obturator nerve, the author thinks that it was probably due to irritation of the appendages of the uterus and not to any direct cause from the uterus itself. Vaginitis was not common. The purulent type produces a profuse purulent discharge which is chronic and persists for months, but ultimately the discharge ceases, leaving no apparent vaginal changes. In the adhesive type the anterior and posterior vaginal walls become adherent to one another. The adhesions are of the firmest kind and the vaginal walls can easily be separated by the finger. A radium burn of the vagina was observed in only one instance. In conclusion the author emphasizes the fact that in no case has malignant disease supervened in a uterus that has been subjected to radium treatment for menopause or any other kind of menorrhagia. No instance of pyometra has been detected in the series of patients with non-malignant conditions treated by radium. The author concludes his article with a summary of his views as to the action of radium. He holds that radium produces a fibrosis and he is convinced that the sole therapeutic action of radium, whether in non-malignant or malignant conditions, lies in its being a stimulator and producer of fibrous tissue which strangles the cancer cells and destroys them. The more slowly growing the carcinoma, the more pronounced is the fibrous tissue reaction, that is, scirrhous cancer. The more rapid the

growth of the malignant cell, the less marked is the fibrous tissue reaction, for instance, sarcoma. Radium, by producing a fibrous tissue formation, naturally assists the body in stemming the invasion by the malignant cell. Should there be few malignant cells, as in an early or operable condition, a big dose of radium producing much fibrous tissue may strangle all the malignant cells and so bring about a cure. Should some of the cells escape the effects of this fibrous tissue, they will multiply and then overcome the fibrous tissue. When this resistance is finally overcome, the growth extends rapidly to its fatal issue.

### OBSTETRICS.

#### Landry's Paralysis and Pregnancy.

R. HORNUNG AND H. G. CREUTZFELDT (*Deutsche Medizinische Wochenschrift*, August 29, 1930) describe in detail two cases of acute ascending paralysis associated with parturition. In one instance they considered that the paralysis was due to a toxæmia of pregnancy, while in the other it was more of an intercurrent type of acute poliomyelitis of the Heine-Medin type. The latter tends to assume a very acute form during pregnancy. They discuss the value of interrupting pregnancy in such cases and quote one instance in which this was done. It is frequently delayed too late when symptoms of involvement of the vagus or phrenic nerves are present.

#### The "Physiological" Anæmia of Pregnancy.

P. BROOKE BLAND, LEOPOLD GOLDSTEIN AND ARTHUR FIRST (*Surgery, Gynecology and Obstetrics*, June, 1930) have investigated the blood of a number of pregnant women with a view to establishing a definite standard in regard to the red corpuscles during pregnancy. Of a thousand patients who were examined at various stages of pregnancy, 47.4% were found to have an anæmia with a red cell count of three and a half million or less per cubic millimetre. Of the patients in the last three months of pregnancy 56% manifested a very definite anæmic condition. It was found that a definite improvement occurred in the blood picture between seven and ten days after pregnancy had terminated. Within two to six months after delivery the blood picture in every instance was practically normal. The authors advance several theories as to the cause of the anæmia.

#### Still-Birth Due to Intracranial Injury.

JOYCE PARTRIDGE (*The Journal of Obstetrics and Gynecology of the British Empire*, Spring Number, 1930) has undertaken the study of the relation of intracranial injury to stillbirths. Reviewing the investigations of ten different observers, she finds that nearly 50% of stillbirths are due to intracranial injury or hæmorrhage in some form or another. She considers that nearly half the infants who

are alive when labour begins and yet are still-born, when the mothers are healthy, die because they have sustained some intracranial injury. She is of opinion that in many instances this is due to either a disproportion between the head of the fœtus and the maternal parts on account of increased cranial capacity of the infant or diminished pelvic development of the mother. Further, she has carried out a series of researches in regard to the movements that take place at the sacro-iliac joint. A series of bodies was investigated and a graph has been drawn by the author showing that the maximum amount of movement at the sacro-iliac joint occurs at about the age of twenty-eight years, while it steadily diminishes till the time of the menopause. The period of maximum movement is from the age of twenty to thirty-five years. The extent of movement rapidly diminishes from this age onward. A graph representing the number of stillbirths due to intracranial injury, worked out as a percentage of total births at different ages, shows that stillbirths are least frequent when the mother is between the ages of twenty and thirty-five years and rapidly increase from that age onwards. The author is of opinion that the movements of the sacro-iliac and pubic joints play quite an important part in the matter of the proportion of the maternal pelvis to the fetal parts. She urges an increased use of the "Walcher" position. Intracranial injury in hurried labours is apparently due in most instances to inadequate flexion of the head, whereby the pressure is exerted on diameters other than the suboccipito-bregmatic. She concludes that intracranial injury can be combated in three ways, namely: (i) Reducing the relative disproportion between skull and pelvis by induction of labour, (ii) enlarging the pelvis by exaggerated posture or pubiotomy, and (iii) by finding a new exit by Cæsarean section.

#### Post-Operative Obstetric Embolus: Its Incidence, Cause and Prevention.

JOHN O. POLAK AND V. MAZZOLA (*American Journal of Obstetrics and Gynecology*, October, 1930) analyses 6,266 gynecological and 5,734 obstetric cases. There were thirteen cases of embolism and six cases of thrombosis in the gynecological series, whereas in the obstetric series there were twelve cases of embolism and thirty of thrombosis. In both series morbidity was present in 100% of patients who had either embolism or thrombosis. There is no single cause, but a number of different conditions which are closely related; changes in the blood plasma, changes in the blood elements, changes in the blood flow, changes in the vessel wall. Obesity is always a factor. Pulmonary embolism is more common after pelvic operations and in women who are forty years of age or more, and in subjects who suffer from some post-operative morbidity, however mild. It is to be noted that thrombosis occurred six times in the gynecological

series and thirty times in the obstetric. A further analysis of the twelve fatal cases of embolus in the gynecological series shows that 75% of patients had leucopenia and 41% hypotension. In the obstetric series 100% had albuminuria, 85% hypotension, 42% anæmia, 14% leucopenia; 50% occurred after spontaneous labour, but all developed a low grade infection. The clinical appearance of thrombosis and embolus usually occurs between the second and third week. Venous stasis, the physiological blood change following operative trauma and infections are the chief causes. Medical treatment of hypotension, a stimulation of the metabolic rate by the administration of thyroloid extract, passive movements of the lower limbs and strict attention to antisepsis and asepsis are points of importance in prophylaxis.

#### The Gastric Juice in Pregnancy.

FRANK ARTZ (*American Journal of Obstetrics and Gynecology*, September, 1930) found as the result of his observations on fifty patients on whom a gastric test meal was carried out, that free hydrochloric acid in all pregnant women was diminished as compared to the non-pregnant women. This was more pronounced in the early months, when nausea was present. In twenty-nine pregnant patients a total absence of acid was noted in the early months. In spite of the hypochlorhydria the total amount of chlorides was normal; this suggests a regurgitation of the alkaline contents of the duodenum. The administration of hydrochloric acid was tried and whilst it was successful in some its very unpleasantness debarred it in others. Acting on W. Morrell-Roberts's paper calling attention to the stimulating action of caffeine on gastric secretion, caffeine citrate was administered; it was effective in causing an increased secretion of hydrochloric acid without the attendant unpleasantness.

#### Puerperal Infection.

T. K. BROWN (*American Journal of Obstetrics and Gynecology*, September, 1930) shows that many cases of puerperal infection in which ordinary cultural methods have failed to demonstrate organisms, are due to anaerobic streptococci. Since 1924 the author has been in the habit of incubating the uterine and blood cultures both aerobically and anaerobically. He has been struck with the frequency of the occurrence of anaerobic streptococci in association with puerperal infection. In contrast to aerobic streptococci which are in most instances introduced from without, the anaerobic are endogenous. To combat this endogenous infection seven cubic centimetres of a mixture of fifteen grammes of mercurochrome crystals and five cubic centimetres of half strength tincture of iodine in 500 cubic centimetres of glycerine have been used. The pronounced decrease of mortality since 1926, when this vaginal antiseptic was introduced, is very suggestive and is worthy of further study.

## Special Articles on Diagnosis.

(Contributed by Request.)

### XXXIV.

#### FOOD POISONING.

ALTHOUGH transmitted through the medium of food, the following groups are excluded from consideration under the heading of "food poisoning": (i) Toxic symptoms of an anaphylactic nature due to personal idiosyncrasy; (ii) deficiency diseases due to loss of vitamin content of food; (iii) food-borne bacterial infections, such as bovine tuberculosis and typhoid; (iv) toxic symptoms produced by metallic poisons, adulterants or preservatives which are in no way inherent in the food itself.

The term "food poisoning" is generally accepted to mean any of the following: (i) Bacterial food infections, namely, illnesses produced by foods which are contaminated with bacteria (such as *Bacillus enteritidis* and allied bacilli and, possibly, *Bacillus proteus*, *Bacillus coli* and others); (ii) Bacterial food intoxications, namely, illnesses caused by the ingestion of foods which contain toxic products of bacterial growth; (iii) illnesses produced by the ingestion as food of substances which are inherently poisonous.

It is now generally accepted that ptomaines, the product of the putrefaction of protein, are not an important factor in the causation of food poisoning, which is really due to bacteria and the toxins which they elaborate. Even outbreaks of poisoning from mussels, cheese, ice cream and potatoes, which were formerly regarded as caused by specific poisons, are now considered to be due entirely to bacterial activity.

#### Bacterial Food Infections.

Bacterial food infections are the most important group because they are by far the most common. The foods chiefly responsible are those derived from cattle and pigs, but fish, fowl, shell fish and vegetables may also cause this type of poisoning. Pork is a common source, because it is preserved by smoking or salting which secures only an imperfect antiseptics; so also are sausages and mince-meat, because their finely divided condition facilitates the rapid dissemination of bacteria. In the majority of cases of food poisoning, the foods responsible have been uncooked or insufficiently cooked, or they have been eaten some days after cooking, during which period bacteria have multiplied and have become numerous enough to cause poisoning. The majority of cases occur during the summer months when the temperature is suitable for bacterial growth. The appearance, taste and smell of the food are not always a safe guide to its wholesomeness. The symptoms are very characteristic, although they may vary greatly in intensity in different individuals. In an average case they reach their maximum within twenty-four hours and subside within two or three days. Usually six to twelve hours after eating the food there is a sudden onset of colicky abdominal pain with diffuse abdominal tenderness and perhaps some rigidity which is not so severe and so persistent as in peritoneal inflammation. Then there is profuse diarrhoea, the stools are at first semi-fluid and offensive; they soon become watery and greenish. Tenesmus may be a very distressing feature. Then occur nausea and vomiting which may be very severe, but are less constant than the diarrhoea. Headache, excessive thirst and, frequently, tenderness and cramps in the muscles of the extremities are complained of. Although prostration is pronounced, fever is relatively low. In a moderately severe illness the temperature may rise to 38.9° C. (102° F.) to 40° C. (104° F.) within twenty-four hours and gradually return to normal within three to six days. Rarely the fever may persist for many days. When this occurs it is probably due to the bacterial infection having spread beyond the bowel and having become septicæmic.

Severe erythema, urticaria or herpes labialis may occur. Restlessness, insomnia or even delirium and, in children,

convulsions may appear in the more acute cases. Also the urine may contain albumin or casts and it is diminished owing to the diarrhoea and vomiting.

In group outbreaks the epidemiological evidence is such that there can be no doubt about the diagnosis; a careful history of meals taken and of persons associated with the patient at these meals generally not only establishes the diagnosis, but determines the food responsible for the poisoning. Isolated cases are uncommon and though in these the symptoms may resemble closely those of food poisoning, the probability is that the sickness is due to some other cause than food poisoning.

#### Bacterial Food Intoxication.

Botulism is the only type of food poisoning which has been proved to be entirely due to a bacterial toxin.

The *Bacillus botulinus*, a spore bearing bacillus, is widely distributed in the soil and, although usually classified as an anaerobe, it may grow abundantly in media which are only partly anaerobic. It grows well and produces virulent toxins at usual atmospheric temperatures. Most of the spores are destroyed by moderate heating, but some are very resistant to prolonged heating. If placed in suitable media under favourable conditions they germinate rapidly, although a few may remain dormant for months.

The botulinus toxin is a true exotoxin and is very toxic to human beings. It is not destroyed by the digestive ferments, but is absorbed unchanged. It is unstable in solution, but very stable in the dried form. Exposure of all portions of food to the temperature of boiling water for seven to ten minutes is sufficient to destroy it.

All known outbreaks have been caused by the consumption of preserved food, the process of preservation having been insufficient to destroy the spores. Practically any preserved food (beef, ham, veal, fowl, fish, vegetables, fruit, cheese and, especially sausage) have been responsible for outbreaks of botulism. If there are associated putrefactive changes (bulging or leaking tins, escape of gas or definite changes in smell and appearance of food), the food will be rejected as unfit for consumption. But these changes may be so slight as to be unnoticed. A slight change in odour or taste is especially likely to be missed if the food is served as salad with mayonnaise or vinegar.

The toxin acts on the peripheral nerve endings, not causing paralysis, but blocking the passage of ordinary nerve impulses, though an impulse of sufficient intensity will temporarily reestablish function. The symptoms differ from those of the first group in the delayed onset and the absence of fever. Diarrhoea and vomiting only occur in one-third of the cases and are much less pronounced, appearing within a few hours after the poisonous meal and subsiding within twenty-four hours. The first symptoms of botulism generally appear eighteen to thirty-six hours after the meal, but they may be delayed for several days. First there is a feeling of lassitude and fatigue which is rapidly followed by progressive muscular weakness and incoordination, with disturbances of vision, talking and swallowing. There may be ptosis, dilated pupils with photophobia, loss of light reflex, loss of accommodation for near objects and, occasionally, nystagmus. There is difficulty in talking and swallowing, due to weakness and incoordination of the muscles concerned in these acts. Weakness of the skeletal muscles is very characteristic. Even in the early stages sustained muscular effort is required to keep the head upright and in the later stages all muscles are completely relaxed and capable only of an occasional isolated movement. There is no muscular atrophy and the reflex arcs are intact. There are no sensory or mental disturbances. The patient may be apprehensive or hysterical, but his mind is clear and he is fully aware of the seriousness of his condition until the circulation and respiration begin to fail.

The temperature is normal or subnormal unless bronchopneumonia supervenes. The pulse, at first slow, soon becomes rapid; a pulse rate of 120 or more per minute is common, with a temperature of 35.6° C. (96° F.) to 36.7° C. (98° F.). The respiration in the later stages becomes rapid and laboured; partial asphyxia and cyanosis appear, and, perhaps, Cheyne-Stokes breathing.



When poisoning is fatal, death is generally due to respiratory or cardiac failure or, if it occurs later, to secondary bronchopneumonia. The majority of deaths occur in from four to eight days after the poisonous meal; if a patient survives for ten days he is likely to recover, but convalescence is very slow and muscular weakness with disturbance of vision may persist for several months. In a series of 429 cases the mortality rate was approximately 65%.

Diagnosis is not possible until the onset of the typical symptoms. If botulism is suspected, careful inquiry should be made with regard to all preserved foods eaten during several days preceding the onset of symptoms and if it is possible to obtain a history of a number of persons having been similarly affected the diagnosis can be established. Isolated cases, however, may occur owing to the custom of tasting food prior to discarding it.

The early gastro-intestinal symptoms may suggest ordinary food poisoning, but the absence of fever and the later disturbances of vision, talking and swallowing should lead to a correct diagnosis. Laboratory tests are of little value.

The absence of fever and normal cerebro-spinal fluid should differentiate the condition from epidemic encephalitis and cerebro-spinal syphilis. The absence of flaccid paralysis should be sufficient to exclude acute poliomyelitis.

Belladonna poisoning may also simulate botulism, but the excitement and delirium of the former do not occur in botulism.

#### Poisoning by the Ingestion as Food of Substances which are Inherently Poisonous.

There are many plants and animals which are poisonous to human beings, but the number which may be mistaken for edible forms is not large. Among plants, poisonous mushrooms are the most likely to be taken by mistake. Ergotism and lathyrism, in which poisoning occurs owing to the contamination of rye and members of the vetch family, do not occur in this country. Also certain varieties of tropical fish are poisonous, but the only form of food poisoning which requires consideration is mushroom poisoning (mycetismus).

Mushroom poisoning has been classified into five groups.

*Mycetismus gastro-intestinalis*.—The symptoms of the gastro-intestinal form of mushroom poisoning are nausea, vomiting and diarrhoea, varying from simple catharsis to violent retching and purging with severe cramps in the abdomen. Usually recovery occurs in a day or two.

*Mycetismus cholericiformis*.—The gastro-intestinal symptoms in the cholericiform type are much more severe, causing rapid loss of weight and strength. The urine contains albumin and casts; 50% to 70% of patients die within three to five days.

*Mycetismus nervosus*.—The symptoms of the nervous form of mushroom poisoning are due to muscarine which acts peripherally upon the parasympathetic nervous system. Violent gastro-intestinal symptoms occur within half an hour to three hours after eating the fungi. They are accompanied by contracted pupils, profuse sweating and salivation, generalized convulsions, delirium and hallucinations or coma. The pulse becomes slow or feeble, respiration becomes laboured and death may occur from heart failure.

*Mycetismus sanguinarius*.—Mushroom poisoning causing blood destruction is rare. The symptoms are caused by hæmolytic of red corpuscles; there is transient hæmoglobinuria. After four or five days a mild hæmolytic jaundice may occur; it may persist for some time, but the majority of patients recover.

*Mycetismus cerebri*.—Signs of cerebral stimulation may occur within four or five hours. Patients are exhilarated, develop a staggering gait and have disturbance of vision. The symptoms rapidly subside and recovery occurs at the end of twenty-four to forty-eight hours.

D. M. McWHAE, M.D., M.R.C.P.,

Perth.

## British Medical Association News.

### NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Queensland Branch of the British Medical Association:

Barry, Davis, M.B., B.S., 1926 (Univ. Melbourne),  
Malanda, North Queensland.  
Saxby, Howard Morris, M.B., 1929 (Univ. Sydney),  
Toowoomba.

### Medical Societies.

#### THE NEWCASTLE HOSPITAL CLINICAL SOCIETY.

MEETINGS OF THE NEWCASTLE HOSPITAL CLINICAL SOCIETY were held on August 18, 1930, and November 5, 1930.

#### Renal Tuberculosis.

DR. F. W. D. COLLIER read a paper entitled "Renal Tuberculosis" (see page 254).

#### Raynaud's Disease.

DR. F. L. FIRKIN showed an unmarried woman, aged forty-two years, who, since August, 1927, had complained of coldness of the hands followed by pain and blistering. The hands, particularly the left, were apt to swell when warmed by rubbing or by immersion in hot water. Numbness of the fingers occurred and watery blisters formed. The bases of the blebs were either blue or red in colour. The blebs lasted seven to fourteen days, gradually drying up whilst fresh blebs appeared on other fingers. The hands were always cold and clammy and the patient was unable to close the fingers or use the hand to any extent. The patient also complained of continual pain in both arms and legs. These symptoms disappeared during the summer of 1927-1928, but reappeared in August, 1928, then lasted for a further period of eight weeks. In July, 1929, the condition recurred. At the time of the meeting the left hand was still affected; there had been no remission during the summer. There was never any definite necrosis. The symptoms followed the text book rule to a certain extent in that there was first local syncope followed by cyanosis and hyperæmia. At the time of the meeting there was a typical lesion on the left hand. Dr. Firkin mentioned that other points to be noted in the patient's history were: (i) She lived by herself and had too much time at her disposal. (ii) Her menstrual periods were very irregular; she often had amenorrhœa for a period of six months and usually had a scanty flow; she suffered from dysmenorrhœa and hot flushes. (iii) Her face swelled occasionally, though urinalysis had never revealed any abnormality. The appearances of her blood were normal. Her systolic blood pressure was 110 and diastolic 60 millimetres of mercury. All her diseased teeth had been removed two years before the meeting. The administration of calcium lactate in a dose of one gramme (fifteen grains) every four hours over a long period had no effect. The administration of glandular extracts had no effect. Three months' diathermy application made the condition worse, if anything.

#### A Case for Diagnosis.

DR. I. MORGAN showed a married man, aged thirty-eight years, a blacksmith and ironworker by trade, who had been admitted to hospital on September 30, 1930. He had felt cold and had had an attack of shivering while sitting in a theatre; later he had vomited a quantity of blood.

At the time of admission his general condition was good, his temperature was 36.37° C. (97.4° F.), his pulse rate was 98 and his respiration rate 24 per minute. His skin was pale and had a yellowish tinge. The tension of his pulse was good.

Nothing abnormal was detected during the examination of the heart or abdomen. At the base of the left lung laterally there was an area of dullness extending from about the level of the fifth rib to within 2.5 centimetres

(one inch) of the costal margin, continuous with the areas of cardiac and splenic dullness.

The knee jerks were normal, the pupils were equal and active; nothing abnormal was detected in the urine. The skin of the lower two thirds of both legs was thin and of a bluish-brown colour.

He had been invalided home to England from the war in 1916 and discharged from the army on account of chronic ulceration of both legs. He had suffered from pneumonia immediately after the war and again in 1927. In 1929 Dr. Royle had performed a ramisection with the hope of relieving his leg condition. The patient stated that the result was unsatisfactory. He had been an in-patient in Newcastle Hospital in January, 1930, for further treatment to the legs. He had lived in England before the war and had come to Australia in 1920.

The blood did not react to the Wassermann test. The stools were examined for occult blood; none was discovered. On October 17 his red blood cells numbered 3,050,000 and his leucocytes 1,560 per cubic millimetre; the haemoglobin percentage was 55 and the colour index 0.9. The red blood cells varied somewhat in size and very little in shape; the staining reaction was normal; blood platelets were very scanty. On October 24 there were 3,300,000 red blood cells and 1,500 leucocytes per cubic millimetre, the haemoglobin percentage was 60 and the colour index 0.91; the blood picture was the same as before save that there was an increase in the number of platelets. The area of dullness on the left side had extended until at the time of the meeting the lower border of it was at least two fingers' breadth below the costal margin. A fairly sharp edge could be felt. No definite notch was palpable.

Radiological examination revealed that the stomach had been either pulled or pushed up into an abnormally oblique position. Later X ray examination of the chest and abdomen revealed a mass corresponding to the area of dullness.

Dr. Morgan said that the patient's general condition had improved slightly; his temperature had remained normal since his admission to hospital, except for a slight rise to 37.25° C. (99° F.) on four occasions. He was taking a liver diet, "Karna Vita," and iron and arsenic in a mixture.

#### Schönlein's Disease.

DR. A. B. K. WATKINS, on behalf of Dr. J. Leah, showed a male patient, aged forty-eight years, who for the previous ten years had suffered from recurrent outcrops of purpuric spots which only involved the legs and which appeared every year, generally in April. The attacks were ushered in with fever and sore throat and there were pains in the knees and ankles which would often swell and remain swollen, sometimes for weeks. The spots on the legs would last for many months and as time went on would gradually change into the colours seen in a resolving hæmatoma. Twelve months before the meeting some teeth were extracted; the patient felt much better thereafter, although the disease did not seem to have altered.

Tonsillectomy had been advised, although it was pointed out to the patient that the effect on the disease was uncertain.

#### Acromegaly.

Dr. Watkins, on behalf of Dr. A. G. Wise, also showed a female patient, aged fifty years. She was about 150 centimetres (five feet) in height and of stout build, although she stated that she had lost weight during the previous year. She complained that she had suffered from "pains all over" for a period of eight years, and recently her eyesight had been failing. It was noted that she had the characteristics of acromegaly; the wide, spade-like hands and enlarged feet and a certain amount of overgrowth of the bones of the lower half of the face. The eyes were also much hypertrophied, the nose was very wide and the tongue enormous, the skin had a brown tinge and a tendency to cyanosis. The skin, however, was moist to touch and quite different from that seen in myxœdema. Kyphosis was pronounced and the patient had a rather apathetic look, though there was no evidence of mental hebetude. Bitemporal hemianopia was present

and X ray examination revealed a regular enlargement of the pituitary fossa in all directions. Dr. Watkins pointed out that this type of patient was not suitable for the external frontal operation, but that a decompression operation in the pituitary fossa through the sphenoidal sinus was the treatment of election. However, this was not advisable immediately, as the patient was suffering from some sinusitis which should be cleared up first.

Dr. Watkins's next patient was a male, aged forty years, who had been subject to attacks of laryngeal stridor for five years. These attacks lasted a few minutes only and were attended with a feeling of suffocation. Usually they were induced by sucking sweets. They were due to the soft hypertrophy of the submucous laryngeal tissues. The patient presented the typical features of acromegaly; his hands were enormously broad—15.0 centimetres (six inches). His feet were very wide and there was a general subcutaneous soft tissue hypertrophy, especially of the tongue. These changes had occurred since 1918 and the patient produced photos of himself as a normal individual up to this date. Before his teeth were extracted recently he had prognathus. He had been an athletic cycle rider and could perform abnormal movement with his scapula and thoracic muscles. He was enormously strong. His appetite was good, but not enormous. His sexual mentality was normal. Nothing abnormal was detected by examination of his central nervous system. There were no restrictions of his visual fields. Headaches were not uncommon, but were not so bad at the time of the meeting as several years previously. The systolic blood pressure was 165 millimetres of mercury. There was no glycosuria. The blood did not react to the Kline test. X ray examination revealed a very large pituitary fossa with erosion of the posterior clinoid process.

Dr. Watkins contrasted this patient, whose pituitary fossa was large and who suffered from few pressure symptoms, with the patient previously shown, whose pituitary fossa was only slightly enlarged, but who suffered severely from pressure symptoms.

#### Hysteria.

DR. G. L. EWAN showed a male patient, aged thirty-seven years. The patient was a fitter and turner by occupation. There was nothing important in the family history. He was the youngest but one of a family of nine. One brother was in a sanatorium for tuberculosis, two died in infancy, another at the age of twenty-eight years of an "internal abscess"; two sisters were said to be healthy and there was no history of any psychopathy. The patient stated that his childhood had been healthy. He was a fairly heavy smoker, but was temperate. He was a fair scholar; he learnt his trade at an early age and had no other occupation. He stated he was always a good "mixer" and fond of sport. He had never been exposed to any undue psychic stresses of any kind and his present home life and environment were satisfactory. He stated that he had been out of employment since January. He was quite well until about the end of November, 1929, when one day, while at work, he experienced a burning or itchy feeling in the toes of both feet, which lasted for about two days. About a month later he experienced numbness in the left leg which was inclined also to be thrown forward in walking. The numbness then extended over the chest and both legs, but the arms and head were free. This lasted for about a month, but the numbness persisted in the two little fingers. Three days before the meeting the second finger on the left hand became very itchy. This was followed by numbness extending up the left arm and down the left side. The patient volunteered the statement that the left half of his body was numb, just as if a knife had been drawn down the centre of his body. He experienced a tight feeling in the precordial region, the left hand was very numb and the fingers stiff, and he was unable to use them.

When he was examined at the hospital clinic it was observed that the left hand was held in a spastic attitude, flexed at the wrist, with all but the second finger extended. There was hollowing of the palmar aspect and there were slow athetoid movements of the fingers. There was some slight wasting of the intrinsic muscles and also those of the forearm. The deep reflexes, supinator, biceps, triceps

and radial, were all brisk; the knee jerks were exaggerated; the organic reflexes were intact. A fine tremor of the outstretched tongue was noticed. The handwriting was good. There was a functional static ataxia and a clumsy functional type of performance in walking the chalked line and in response to tests for cerebellar coordination. There was apparent complete absence of vibration sense over both tibiae. Eye movements were good. No intention tremor, nystagmus nor speech defects were evident. The pupils were somewhat contracted; the right pupil was slightly larger than the left and irregular in outline, and somewhat sluggish in its reaction to light.

His admission to hospital was then arranged. Further examination revealed the existence of a patchy anaesthesia of the left hand extending proximally as far as the metacarpophalangeal articulations. There was some loss of pin point discrimination and discrimination between hot and cold over the same area. There was also hypoesthesia of both hands and forearms. The distance between the caliper points on the front of the forearm was not recognized at a distance of 13.7 centimetres (five and a half inches). There was also apparent loss of sense of passive position of the left little finger. Vibration sense was now found to have returned over both tibiae. There was no evidence of reaction of degeneration in the affected muscles. His blood serum did not react to the Kline test. Neither the blood serum nor the cerebro-spinal fluid reacted to the Wassermann test.

No abnormality of the lower cervical vertebrae was detected radiographically. Perimetry revealed a restriction of the fields of vision with some distortion in the field of the left eye.

Dr. Ewan remarked on the patient's significant statement that the left half of his body was numb, just as if a knife had been drawn down the centre of his body. Not only did the nature of this paresthesia indicate a functional origin, but it was the key to the situation regarding treatment. There was a confusion of "right and left" with "right and wrong." The loss of sensation was indicative of the patient's wish not to admit or feel some desire which was wrong. It seemed that in this class of psychoneurosis an attempt must be made to discover the unconscious strivings if any radical cure was to be effected. Although this ideal had not yet been attained in the treatment of the patient before the meeting, there had been a good response to suggestion and Faradism to the affected limb. Normal function was already being rapidly restored.

#### Tumour of the Lung.

DR. R. H. RUSSELL showed a married female patient, aged twenty-nine years, who had complained of pain under the left shoulder blade for a period of four months; during the few weeks prior to the meeting she had suffered from pain round the lower part of the chest. The pain was worse when she used her left arm. She was unable to lie on her right side at all on account of pain which eased if she lay on her left side. The pain was not aggravated by deep breathing. She had suffered from asthma for about ten years, always had a slight cough and was breathless on exertion. She had lost no weight. She had suffered from pleurisy and pneumonia on the left side in childhood. During the winter she suffered from bronchitis as a rule and then coughed up a good deal of blood-stained sputum. She had lived in the country until about six years before presenting herself for examination. She was a stout woman; her chest wall was very tender round the base on the left side, and this made percussion difficult. There was no pronounced dullness, but there were fine crepitations throughout this area and respiratory movement was slightly limited.

An X ray examination revealed a large rounded tumour of the upper part of the left side of the chest. It appeared to be in contact with the chest wall under the scapula.

A blood count revealed a mild secondary anaemia, but no eosinophilia and there was no response to the Casoni test. Later, a positive complement deviation test for hydatid was obtained.

It was considered that the tumour was probably a hydatid in spite of its large size and the severity of the pain.

## Medical Practice.

### CERTIFICATES OF DEATH.

THE following is a copy of a letter recently received by the Honorary Secretary of the Queensland Branch of the British Medical Association. It is published at the request of the Editorial Committee of the Queensland Branch for the information of medical practitioners in Queensland.

Department of Justice,  
Brisbane,

15th January, 1931.

Sir,

*The Coroners Act of 1930.*

I have the honour, by direction, to draw attention to Subsection 3 of Section 5 of the abovenamed Act, which provides that, except with the consent of the Coroner, a medical practitioner shall not, under penalty not exceeding £200, give a medical certificate as to the cause of death in respect of any death where any person—

- (a) Is killed;
- (b) Is found drowned;
- (c) Dies a sudden death of which the cause is unknown;
- (e) Dies while under an anæsthetic in the course of a medical, surgical, or dental operation, or operation of a like nature.
- (f) Dies, not having been attended by a medical practitioner at any period within three months prior to such person's death.

Yours obediently,

(Signed) J. D. O'HAGAN,  
For Under Secretary.

The Secretary,  
Queensland Branch,  
British Medical Association,  
Brisbane.

## Correspondence.

### THE FEES OF SPECIALISTS.

SIR: In reply to the letter from "G.P." published in THE MEDICAL JOURNAL OF AUSTRALIA of January 17, 1931, may I be permitted to make a few comments? Many of us who have been in general practice have felt as "G.P." feels about the fees of specialists. Some of us have collected good fees for consultants, when we knew we would receive no payment ourselves for the services rendered to a patient suffering from a long and serious illness. Fees for medical services, like the payment for other services, are controlled by the law of supply and demand. The consultant who can demand the highest fee is not necessarily the one who has given the most time or spent the most money in preparing himself for his work. Nor is he necessarily the one who is most expert at his work. Certain people are naturally qualified for the work of consultants. They are men and women of sound judgement, who understand the meaning of human behaviour and are able to handle patients and their friends. There are others who become successful by sheer hard work and perseverance. The patient or doctor chooses his consultant on account of his confidence in him and the consultant is paid according to the demand for his services. Many successful consultants have graduated from the ranks of general practitioners, where they became particularly interested and expert in one branch of medicine or surgery and subsequently limited themselves to the practice of this branch. When we come to the question of surgical operations there is another aspect which ought to be considered. The surgical consultant is not necessarily the most skilled operator. Too often the opinion of the consultant or the work of investigation required to determine whether in the best interests of the patient's welfare, the operation should be performed or not, as a rule is not valued by the patient or his friends like the work of the operating surgeon.



I shall conclude by a reference to the fees paid to anaesthetists. When an operation has been decided upon, naturally it is the craftsman, the surgeon, who counts. Consider the position of the anaesthetist. If he is a man who is doing his work conscientiously, he should have access to the patient before the operation in order that he may determine the patient's fitness for having an anaesthetic administered and the best kind of anaesthetic to be used. A competent anaesthetist induces a state of anaesthesia best suited to the surgeon's requirements for a successful operation. He is with the patient for at least the same time as the surgeon and sometimes has to forgo other work in order to do this. The surgeon can postpone or otherwise arrange his operation to suit his own time. The work of the anaesthetist, however keen he may be, is often monotonous compared with the work of the surgeon. The anaesthetist receives about one-eighth of the amount or less for his services than the surgeon receives.

Is the supply of skilful anaesthetists so much in excess of the supply of skilful surgeons?

Yours, etc.,

"G.P. SECUNDUS."

January 26, 1931.

### LEPROSY.

SIR: When Sir Leonard Rogers wrote the article (THE MEDICAL JOURNAL OF AUSTRALIA, October 18, 1930) upon which my friend Dr. Cook makes adverse comment (February 7, 1931), the principal cause for criticism was not so much the subject matter of the communication as the fact that its author gave the impression that he was the first to advocate the abandonment of the enactments against leprosy in this State. It can be said that Sir Leonard Rogers, beyond any possibility of doubt, was in possession of the information that such a campaign had been started by Tebbutt and Molesworth nearly five years ago (THE MEDICAL JOURNAL OF AUSTRALIA, September 18, 1926).

Only partial success attended these efforts and this little was obtained in spite of the use of the authority of Rogers and Muir in opposition. These authors, in their book, "Leprosy," published in 1925, displayed a preference for the theory that segregation had rid Europe of leprosy in the past, and that it was an effective weapon against the disease at the time their book was written.

Today, by contrast, Muir, in a "System of Bacteriology," 1930 (leprosy section), says on pages 378, 379: "In certain limited and well circumscribed and isolated areas, such as islands, it may be possible to secure good results by complete isolation of infectious cases, if there be an enlightened and autocratic government; but where such conditions are absent, as in Africa, India and China, the most hopeful line of procedure is by using as little compulsion as possible . . ."

Sir Leonard Rogers, too, has entirely shed any belief in the effectiveness of isolation today as shown in his paper of October last.

It is very pleasing to welcome these two authorities on the side of reform, but at the same time it is really amusing that Sir Leonard Rogers, whose authority hindered the reform five years ago, should stand forth today as the initiator of that reform.

To return to Dr. Cook's complaint, I must confess to a strong feeling of disappointment in his attitude. It is painful to think that he has assumed the mantle discarded by Sir Leonard Rogers and maintains that the credit for the present comparative freedom of New South Wales from leprosy is due to "the existing prophylactic system." If there was little justification for such a belief in 1926, there is none at all today.

The modern attitude toward isolation is admirably expressed in Topley and Wilson's "Principles of Bacteriology and Immunity," 1929, Volume II, page 784, where is found the following: "If isolation removed from the community the whole, or even the great majority of infected individuals, it might be expected to exert a considerable influence on the prevalence of an infective disease.

But if the ratio of latent or atypical infections to clinically recognizable cases is high, we cannot hope to effect any marked reduction in the morbidity rate by removing to hospital those cases which exhibit the typical stigmata of the disease . . . It is interesting to find that the expectations based on bacteriological and experimental findings are borne out by administrative experience . . . The value of the isolation hospital must apparently be judged by the benefit which it confers on the sick within its walls; for it would seem to have little effect on the health of the community as a whole."

Though these findings were expressed as applying to infective conditions generally, they could not have been worded to fit the case of leprosy better if they had been designed for that purpose. We all know that it is only a rarity that a leper is discovered and isolated until he has been a source of infection for a long time. Therefore, the isolation found wanting in Topley and Wilson's experiments with animal herds cannot but receive the same verdict when the credit for the wane of leprosy is being considered. It is true that in the section on leprosy these laws are not applied by the authors, but this is obviously due to an oversight, or to their lack of personal knowledge of the leprosy problem.

If Dr. Cook had leaned on the theory that better nutrition and hygiene had brought about the present state of affairs there would not have been so much sadness in my heart. But to think he is standing in the way of a saving of about £20,000 per annum by the New South Wales Government (£500 per leper per annum according to Rogers) by upholding a belief shown to be completely erroneous, makes me despair of ever obtaining relief in the income tax rate, so long as such expenditure so useless to control an infective disease is given the approval of any medical man.

The withdrawal of the support of Rogers and Muir left no excuse for the continuance of this useless expenditure, and of the cruel and discriminating injustice inflicted upon the unfortunate sufferers from leprosy.

One must not complain too bitterly, however, for even before the troublous modern days was it not written, "thine enemy shall distress thee in thy gates"?

Yours, etc.,

E. H. MOLESWORTH.

235, Macquarie Street,  
Sydney.

February 9, 1931.

### TONSILLECTOMY.

SIR: In your leading article of February 7 on tonsillectomy you make some extraordinary and harmful statements and in challenging their accuracy I assure you that I have a genuine desire to reveal the truth, and have no idea of proclaiming my prowess as enjoined in the leader, to portion of which I take strong exception.

I did not enter into the recent discussion on the various methods of removing infected tonsils, believing that all the methods advocated had their uses, and, in expert hands, would give satisfactory results. Your statement that Sluder's operation always results in incomplete removal of tonsil makes it quite evident that you are unacquainted with the technique and results of many men who make skilful use of the tonsillotome.

As introduction to my objections, may I state that the object in interfering with the tonsil at all is to remove infection that is contained in the intratonsillar fossa and in the tonsillar crypts? An operation, whether cutting or diathermy, that falls short of complete removal of infection fails in its object. Below the tonsil is situated a collection of lymphoid tissue, disconnected with the tonsil but sometimes referred to as the lingual extension of the tonsil. This lymphoid tissue contains no crypts and I should be interested to hear that anyone has found infection here. I never have after careful search. Frequently during the inflammatory reaction following a tonsil operation this lymphoid tissue swells and pushes into the operation

wound and can then be mistaken for the lower portion of a tonsil.

In passing on to my major charges I object to your term "Sluder's operation" to denote operations performed with the tonsillotome. It should be more generally known and recognized in Australia that the Englishmen, Dr. Willis and Dr. Pybus, were the first to demonstrate that tonsils could be completely enucleated with the tonsillotome. Another minor objection is that you attempt to draw a distinction between the grossly infected tonsil and the not grossly infected one. This sounds very well, but in practice no such distinction can be made.

And now for the major charges that the leader contains—statements which are contrary to fact and conclusions which are illogical were your statements correct.

I challenge your bald statement that operations performed with the tonsillotome always result in incomplete removal of the tonsil. I do not agree that "Sluder's operation is easy of completion" until the knack has been acquired by practice, and not even then is it always easy of completion. I know men who, not satisfied with the tonsillotome in their own hands, have rightly abandoned it altogether in favour of dissection.

I most emphatically claim that the expert with the tonsillotome can remove the complete tonsil in practically all children and in the majority of his adult cases. The lower pole of the tonsil can in most cases be as easily removed with the tonsillotome as by dissection. The lymphatic tissue below the tonsil cannot be removed with the tonsillotome, but, in my opinion, it never requires removal. Is this lymphatic tissue your lower pole? Essentials of all operations, whether tonsillotome is used or not, are that the removed tonsil should be closely scrutinized and the faucial cavity closely inspected. No portion of the tonsil, whether lower pole, upper pole, or middle, should be left *in situ*. I am not advocating the exclusive use of the tonsillotome. I am not even suggesting that it need be used at all by those who are satisfied with the results obtained by other methods. I make frequent use of the tonsillotome myself, but often prefer to dissect a difficult case, but I most strongly advocate that your leader writer should be sure of his facts before making statements likely to have far reaching and harmful results.

Now to deal with your illogical conclusions. You condemn the tonsillotome operation outright for adults, but condone it for children in whom you admit that it is apparently successful and try to explain this apparent success as due to mild infection (do you mean no infection) combined with the fault in the operation not being discovered. If your facts are correct, surely the only logical conclusions you could arrive at would be that the tonsillotome operation should be absolutely and utterly condemned and that it should not be perpetrated even on children.

No sir! The results of a properly performed operation are really and equally good, no matter whether the tonsillotome or dissecting method is employed. By properly performed, I mean one that will never have to be repeated because the whole of the infected tonsil has been removed.

No operator is infallible. I have left my bits after both tonsillotome and dissecting operations, but that was the fault of the operator, not the method.

I agree with the concluding sentence of your leader. May I sincerely offer the sentiment it expresses as excuse for writing at such length.

Yours, etc.,

BRYAN FOSTER.

61 Collins Street,  
Melbourne,  
February 9, 1931.

SIR: Many members of the profession have awaited judgement upon the prolonged tonsillectomy discussion which appeared in the correspondence columns of the journal some months ago. This judgement is provided in your leading article of February 7, 1931, and has been

very fairly stated. The pros and cons of the Sluder method, the dissection method and diathermy have been weighed and evaluated and the pronouncement, with certain reservations, is given in favour of enucleation by dissection.

Your article states that the "Sluder operation, though easy of completion, always results in incomplete removal of the tonsil," which means that a few years later hypertrophied tonsillar tissue again appears in many cases, necessitating a further operation. Repeated operations on the tonsils are annoying and discouraging to the parents of a child and bring tonsillar surgery into disrepute and distrust. Seeing that the Sluder operation is always incomplete, even when performed by an expert, the question now arises: Should Sluder's operation be universally abandoned? Personally I think it should be, as surgical science and the public alike now demand a more accurate and complete operation, as found in the dissection method.

With the abandonment of Sluder's operation, however, the general practitioner must choose between a reduced income and the task of learning the dissection method. Many general practitioners in the suburbs and country are sound general surgeons and accustomed to major surgery. These men would, I feel sure, be quite capable of performing dissection with reasonable skill, providing they have the opportunity of learning the technique and gaining practice and experience.

The change over from Sluder's method to dissection, however, is not to be taken lightly, as the latter is a much more difficult and more severe operation, and a bad dissection will leave tonsillar tissue behind in the same way as a Sluder operation. Unless a dissection is thoroughly and skilfully performed, the change over would be a retrograde, not a forward move.

Three years ago I decided to abandon Sluder's operation and commenced dissection and, having now performed well over three hundred tonsillectomies by this method I feel that I give better service than with the old method. Enucleation by dissection is to be recommended to other general practitioners and, in a few years, I predict that Sluder's operation will be a thing of the past. I admit the change over requires courage and much time spent in studying the technique of an expert, but the satisfaction of knowing one has made a "job" of the case fully repays the effort and time required in becoming efficient.

Many cases must be done before one becomes even moderately skilful and the practitioner who has not abundant material to work on would be well advised not to commence dissecting.

The general practitioner dissector will, of course, here, as elsewhere, realize his limitations and refer the very difficult cases to the consultant.

With apologies to the method of Sluder.

Yours, etc.,

A. LESLIE WATSON.

Brighton le Sands,  
Sydney,  
February 12, 1931.

#### THE WAR AND SIR NEVILLE HOWSE'S PART THEREIN.

SIR: The fact that the letter appearing under the above heading in your issue of January 31, and which for its arguments draws freely on the recently published first volume of the Official History of the Australian Army Medical Services, is concerned primarily with a personal criticism of the late Major-General Sir Neville Howse, makes desirable, I think, a brief statement from me.

As a preliminary I must, and emphatically, disclaim the assumption of any right or any desire to deprecate the freest exercise of individual judgement or the making of personal deductions from the facts recorded in the history, or a disagreement with any opinions or conclusions expressed therein. On the contrary, its chief purpose is to promote thought and discussion; and I must cordially welcome and shall earnestly study any sincere and unpre-

judged endeavour rightly to display the past as a mirror for the future. Any such efforts, to my way of thinking, have the same kind of worth as are held to invest fearless and disinterested attempts at the time to insure that the right thing should be done and those striving to do it supported. My regard, moreover, for the memory of my friend and honoured chief, not less than for the responsibility that devolves on me as the editor of the history of the Australian Army Medical Corps, will certainly insure that the presentation of the part played by Sir Neville Howse in shaping the course of those events whose history is his own biography, shall be no indiscriminating panegyric of his person or uncritical eulogy of his administration. Judgement on the individual part played by Sir Neville should, in my opinion, be deferred till its presentation in official records is complete.

But I feel that, in the form that the discussion has taken, it is right that I should state my emphatic dissent from the general judgement delivered by Lieutenant-Colonel Springthorpe. Colonel Springthorpe must be given credit for a strong and sincere personal conviction regarding the period covered by Volume I. He has stated his intention of deferring his final award till the publication of Volume II. He, with every member of the A.A.M.C., can insure due weight in the Official History to his views or to pertinent facts that he may desire to bring forward. In the meantime, to those who may be interested in the study of the work of the medical profession of Australia in the war—and it is difficult to escape the conviction, even in these days of "disarmament," that at least in Australia we should all be interested—I suggest that they beg, borrow or steal (or even help on the good work and buy) a copy of Volume I and judge for themselves.

Yours, etc.,

A. G. BUTLER.

Duntroon,  
Federal Capital Territory,  
February 12, 1931.

### Books Received.

ABDOMINO-PELVIC DIAGNOSIS IN WOMEN, by A. J. Walscheid, M.D.; 1931. St. Louis: The C. V. Mosby Company; Melbourne: J. Ramsay. Crown 4to, pp. 1023, with 397 illustrations and one colour plate. Price: 70s. net.

THERAPEUTICS, MATERIA MEDICA AND PHARMACY, by S. O. L. Potter, A.M., M.D., M.R.C.P. Fifteenth Edition; Revised by R. J. B. Scott, M.A., B.C.L., M.D.; 1931. Philadelphia: P. Blakiston's Son and Company. Royal 8vo., pp. 1012. Price: \$8.50 net.

### Medical Appointments.

Dr. J. K. D. Mackenzie (B.M.A.) has been appointed Certifying Medical Practitioner at Glenthompson, Victoria, pursuant to the provisions of the *Workers' Compensation Act*, 1928.

Dr. R. W. Nicholls (B.M.A.) has been appointed Certifying Medical Practitioner at Murchison, Victoria, pursuant to the provisions of the *Workers' Compensation Act*, 1928.

### Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

ALFRED HOSPITAL, PRAHRAN, VICTORIA: Medical Vacancies.  
CHILDREN'S HOSPITAL, CARLTON, VICTORIA: Honorary Vacancies.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Honorary Relieving Assistant Pathologist.

SAINT MARGARET'S HOSPITAL FOR WOMEN, SYDNEY, NEW SOUTH WALES: Pathologist.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Relieving Assistant Gynaecological Surgeon.

THE BRISBANE AND SOUTH COAST HOSPITALS BOARD: Clinical Assistant.

### Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmalm United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Prudential, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Hospital. Mount Isa Mines.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

### Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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